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BULLETIN No. 111

BIOLOGICAL SERIES No. 37

BIRDS OF
SOUTHERN ALBERTA

By

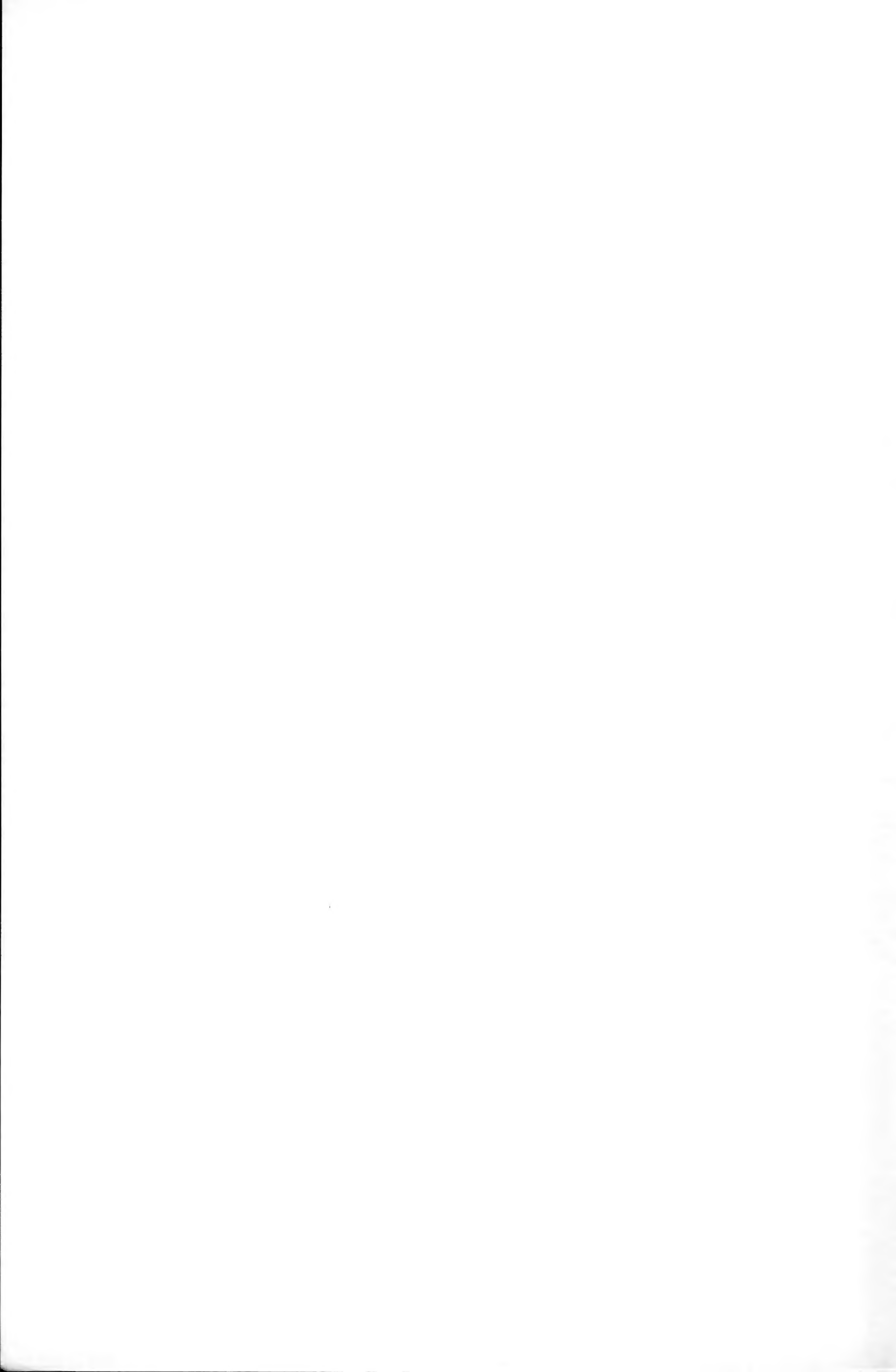
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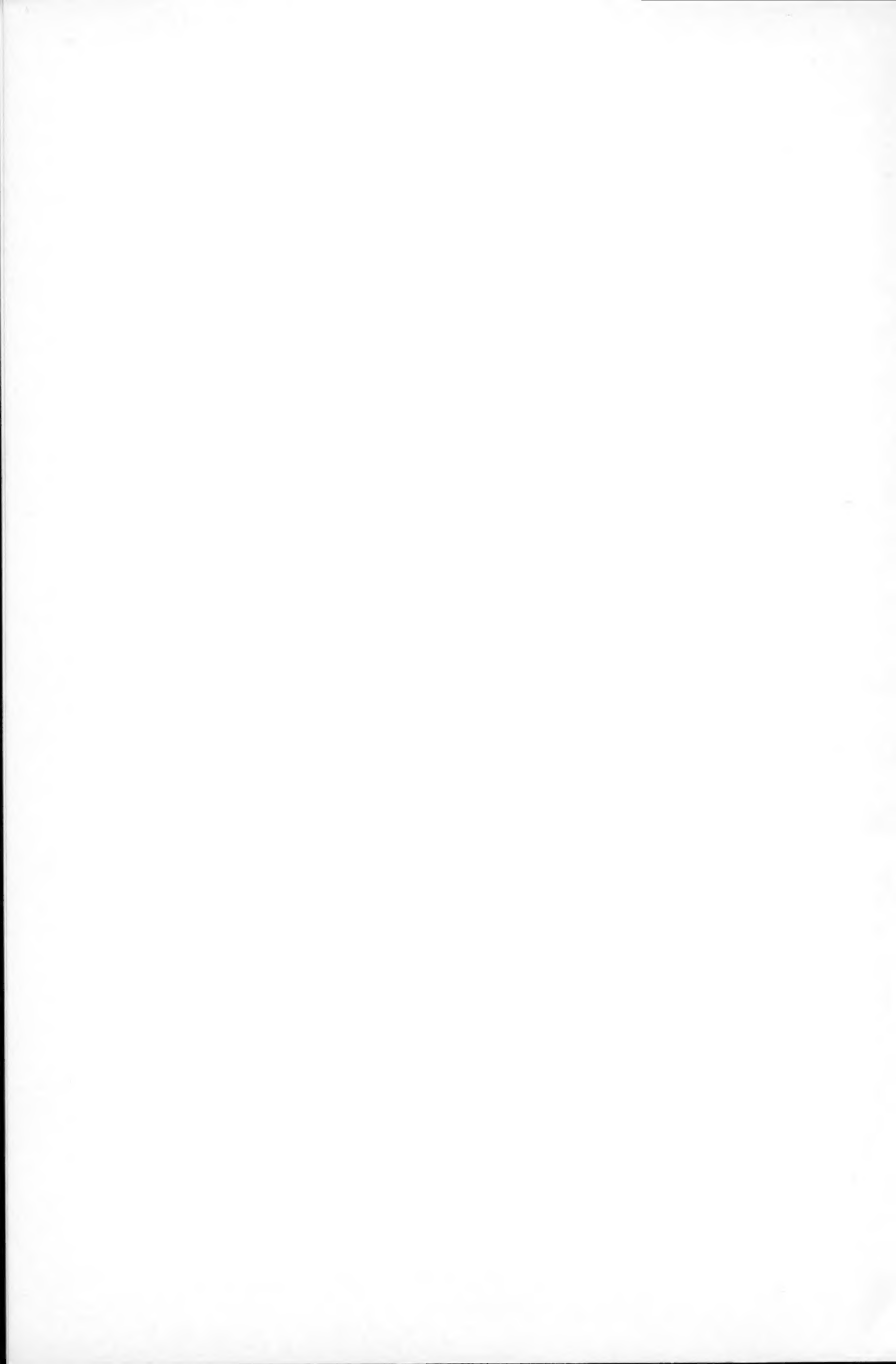


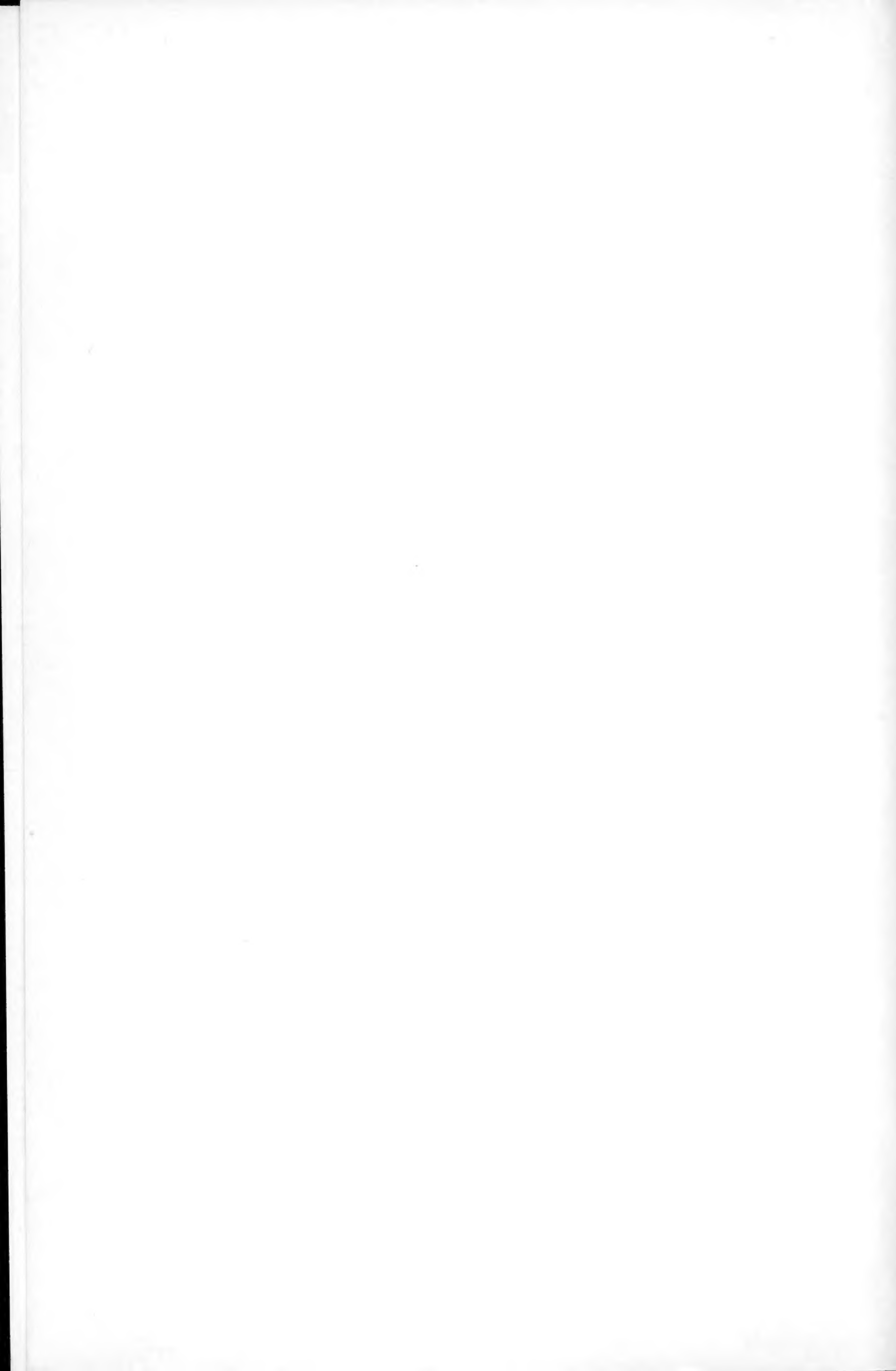
THE QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
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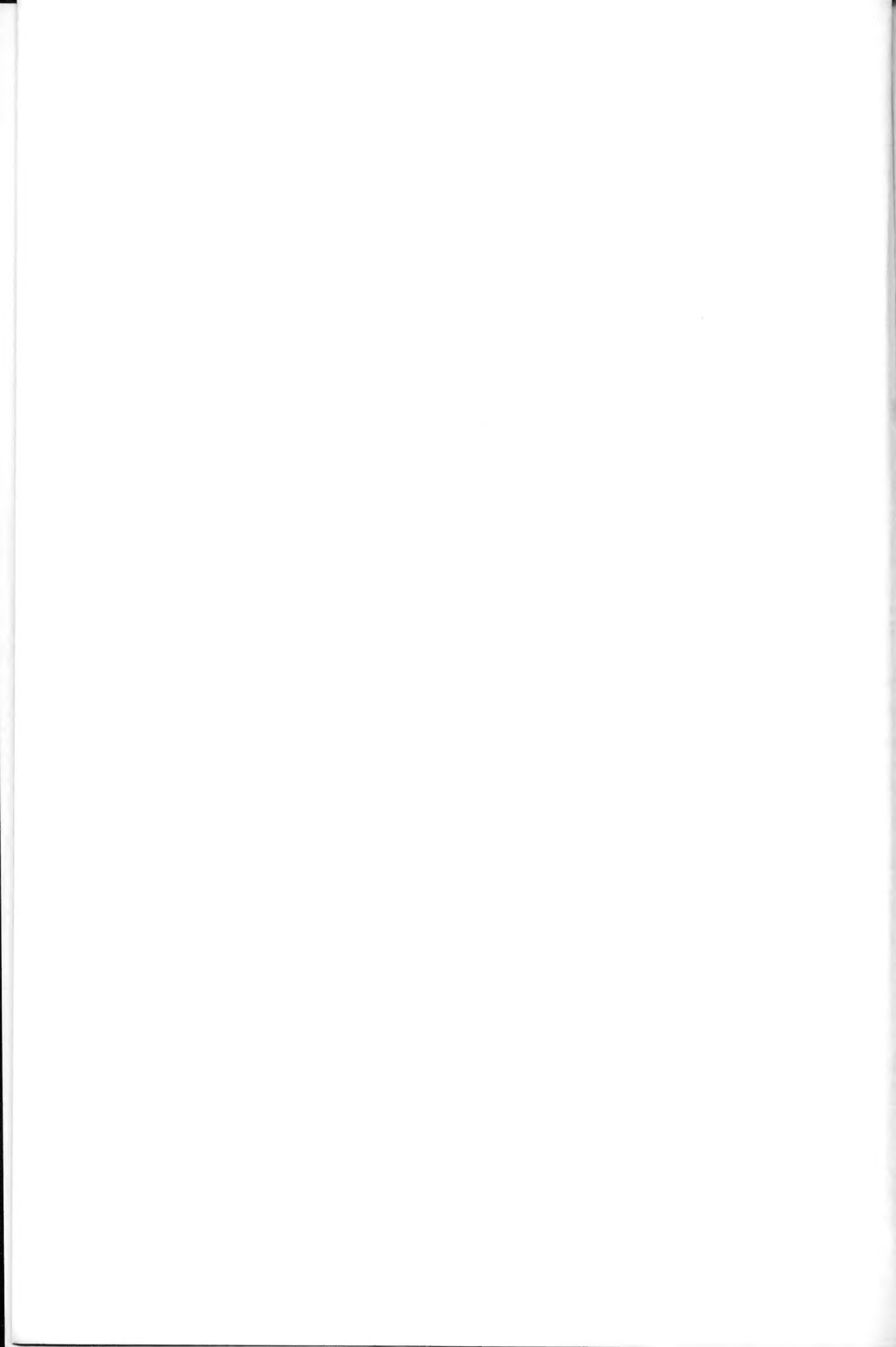
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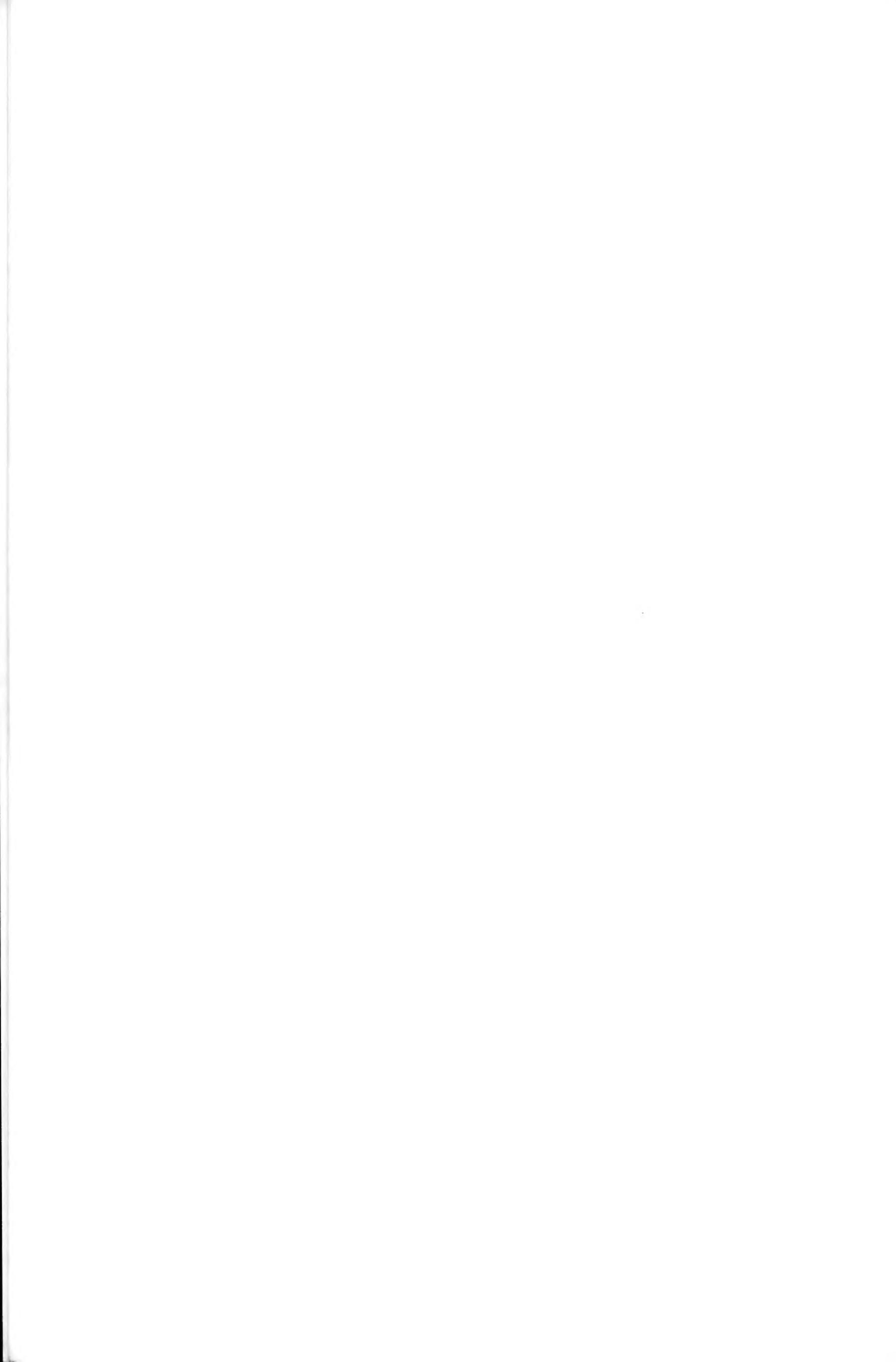


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BIRDS OF SOUTHERN ALBERTA

INTRODUCTION

Material and notes on the birds of southern Alberta have been accumulating in the National Museum from its field parties for some years, and as it is one of the least documented areas, ornithologically, in the provinces of Canada, the material is here brought together.

William Spreadborough, of the Geological Survey of Canada, collected in the vicinity of Medicine Hat from April to June, 1894, and secured about one hundred and fifty-nine specimens, according to the records. Macoun and Macoun (1909, *Catalogue of Canadian Birds*, Ottawa) used Spreadborough's material, but some of the specimens recorded there cannot now be found; and in the present report only specimens examined, now in the National Museum, are used from Spreadborough's work.

P. A. Taverner of the National Museum staff, accompanied by Hoyes Lloyd of the National Parks Bureau, made a traverse of southern Alberta by car in late July and early August, 1920. Their itinerary, taken from Taverner's diary, was as follows:

July 29, 1920, from Calgary to camp at Caruso, 3 miles west of Strathmore.

August 1, 1920, left Strathmore, and passed through Ballina, Gleichen, Bassano, Leckie, Southesk, Brooks, and Macbeth, to camp near Bantry.

August 2, Bantry to Medicine Hat, via Tilley, Suffield, and Redcliff.

August 3, Medicine Hat to Pakowki, via Wisdom and Orion.

August 4, moved camp on Pakowki Lake, passing through Etzikom and Nemiskam.

August 5, Pakowki Lake to Manyberries Creek.

August 6, to Elkwater Lake.

August 7, to Many Island Lake.

August 8, crossed into Saskatchewan.

Taverner made a small collection of birds, and his notebooks on file in the National Museum have been used in preparing this report.

In 1922, C. H. Young of the National Museum spent the summer, May 15 to September 22, collecting birds and mammals in Waterton Lakes Park. His collection numbered only a few dozen birds, but his field record book of birds seen has been used in this report.

In 1923, Young was again in Waterton Lakes Park, May 9 to September 15. His bird collection numbered nearly one hundred skins, but there appears to be no field book of his bird observations.

In 1927, J. Dewey Soper was employed by the National Museum to collect mammals in southern Alberta, but he also collected nearly one hundred bird specimens for the National Museum. Soper's itinerary, taken from his specimen labels, was as follows:

June 23-July 3, Milk River.

July 7-11, Sweet Grass Hills.

July 13-19, Deer Creek.

July 20, Pendant d'Oreille.

July 20-30, Eagle Butte.

In 1945, A. L. Rand of the National Museum, accompanied by Howard Clemens as student assistant, was studying birds and mammals in southern Alberta. His itinerary, as it affects this report, was as follows:

June 22-28, Cassils and Brooks area.
 June 29-July 13, Cypress Hills.
 July 13-27, Dominion Range Station.
 July 27-August 13, Waterton Lakes Park.

Later, in September, Rand motored widely in southern Alberta on other work and made a few bird notes.

A collection of two hundred and seventy-five birds was made, as well as a series of observations.

Various other persons have contributed to the southern Alberta data in the Museum: Dr. R. M. Anderson collected a few specimens in Waterton Lakes Park, when he was making a mammal survey there in 1938; Dr. C. H. D. Clarke has deposited in the Museum a few 1939 manuscript notes on the birds of Waterton Lakes Park, made while he was with the National Parks Bureau; Dr. L. S. Russell of the Geological Survey of Canada collected one bird in southern Alberta in 1934, when he was doing geological work there.

Northern and central Alberta has many ornithological papers dealing with restricted areas; just to the north of our area there is notably the "Birds of Banff National Park, Alberta" by C. H. D. Clarke and Ian McT. Cowan (1945, *Can. Field-Nat.*, 59, pp. 83-103); "The Birds of the Red Deer River" by P. A. Taverner (1919, *Auk*, 36, pp. 1-21, 248-265); and "Birds of the Battle River Region" by Frank L. Farley, published in Edmonton.

South of Red Deer River and Banff Park most of our knowledge has rested on the distributional data in *Catalogue of Canadian Birds* by Macoun and Macoun (Ottawa, 1909); Elliot Coues' Canadian observations in "Field Notes on the birds observed in Dakota and Montana along the Forty-Ninth Parallel during the seasons of 1873-1874" (*Bull. U.S. Geol. and Geog. Survey of Terr.*, vol. 4, 1878, pp. 545-661), and Blackiston's account "On birds collected and observed in the Interior of British North America" (*Ibis*, vol. 3, 1861, pp. 314-320, and vol. 4, 1862, pp. 3-10). More recently, Munro has given us various glimpses of southern bird life; especially water birds, in the volumes of the *Canadian Field-Naturalist*; M. Y. Williams has recorded his observations on the plains (1946, *Can. Field-Nat.*, 60, pp. 47-60); and Soper (1947, *Can. Field-Nat.*, 61, pp. 143-173) has given us notes on the mountains.

The purpose of the present paper is to make available additional data that can be used in a comprehensive report on the birds of Alberta.

THE AREA

Southern Alberta, south of Red Deer River and Banff, presents considerable diversity: the Rocky Mountains rise sharply from the plains in Waterton Lakes Park on the western edge of the prairie from about 4,000 feet at the lakes to peaks nearly 10,000 feet high, with many lakes and streams. The plains, stretching eastward from the mountains, vary from flat to decidedly rolling, and average about 3,000 feet in altitude. The



Dominion Range Station near Milk River, showing a small area of impounded water, the groves of planted trees, and the plains.



Forest on the north slope of the Cypress Hills, near their western end.

striking local details of topography are: the Sweet Grass Hills that lie just south of the Canadian border, but with an altitude of 6,300 feet at the top of the West Butte are conspicuous landmarks; the Cypress Hills in southeastern Alberta, a ridge lying partly in Alberta and partly in Saskatchewan that rises to about 1,600 feet above the plains; and the river courses that have dug deep steep-sided valleys, canyon-like in places, into the prairies, notably South Saskatchewan and Milk Rivers. These rivers have mainly an east and west course; badlands occur in places, and there are many coulees, dry or nearly dry during the summer.

Lakes are few and shallow; irrigation projects and storage tanks for water for cattle have increased the amount of water on the plains, but marshes are scarce.

The crests of the Rocky Mountains in Waterton Lakes Park rise above timber-line to alpine conditions; the east slope of the Rockies carries stands of coniferous forests and aspen; and, isolated, far in the plains on the Cypress Hills is another area of coniferous and aspen forest. In the plains along the main rivers, sunk far below prairie level, groves of poplars and river borders of dense brush are found. On the plains themselves short grass, usually heavily grazed, predominates, with areas of wheat-farming. Depressions, which seasonally hold water, have denser grass growth, and in coulees patches of shrubbery and occasional sage-bush flats occur. Marshy vegetation is scarce and local. Where irrigation has been developed and trees have been planted, as about Brooks and west of Taber, the appearance of the once treeless, arid plains has changed greatly.

THE BIRD FAUNA

The presence or absence of trees has, of course, a great effect on the distribution of birds, and on the plains their presence or absence is an all-important factor.

Out on the plains, where the grass is short and heavily grazed, summer resident bird life is very scarce, limited to little more than horned larks, McCown and chestnut-collared longspurs. The vesper sparrow and meadowlark are fairly widely distributed, but favour slightly heavier grass. Where the grass is more abundant the Savannah sparrow is common, and, locally, the lark bunting.

Where rose-bush shrubbery appears the clay-coloured sparrow does also; and nesting along dry coulees are ferruginous rough-leg hawks. With the increase of shrubbery, and a few low trees, more species appear: the kingbird, shrike, lark sparrow, Swainson hawk, and the sharp-tailed grouse. Cliffs, sometimes not much more than steep mud banks of small coulees, may attract cliff swallows to nest, if mud for their nests is available. Such broken terrain is the habitat of rock wren and Say phoebe; with sage-brush, Brewer sparrow appears and locally the sage grouse.

With the appearance of water on the prairie a host of water-frequenting species appear. In the area near Tilley in the Brooks region one drives over the bare prairie, with only the longspurs and horned larks in sight, to suddenly find the contrast on Louisiana Lakes, a project of Ducks Unlimited. Here, with the hollows filled with water, thousands of birds are in sight at once; at least ten species of ducks are nesting in large numbers; grebes and ring-billed gulls nest; and avocets, marbled godwits, willets, and



Milk River in its deep valley through the plains. Along the river itself are groves of poplar and areas of thick shrubbery, rich in bird life.



Looking toward the Rocky Mountains in Waterton Lakes Park, from Pass Creek.

killdeer are scolding all about. Where the impounded water holds reeds, as at Ducks Unlimited project called San Francisco Lake, near Cassils, Franklin gulls nest in huge colonies; and there are coots, red-wings, and yellow-headed blackbirds. Lake Newell, to the south of Brooks, is said to have a still richer bird fauna, with cormorants, pelicans, and geese nesting. (T. Randall has prepared a paper (1946, *Can. Field-Nat.*, 60, pp. 123-131) on the birds of this irrigated section, based on several seasons' work, that will serve as a standard for comparing this with unirrigated areas.)

Another contrast with the plains is furnished by the tree plantations that have sprung up around irrigated establishments. That about Brooks is particularly rich in kinds of trees, including conifers, and here there is an astonishing variety of nesting birds, including flickers, shrikes, robins, yellow warblers, catbirds, thrushes, and wrens. Other plantations newer and poorer in species of trees may have a relatively poor bird fauna. In the sizable tree plantation about the Dominion Range Stations the only tree species the plantation seemed to have attracted commonly was the goldfinch.

The change in bird life from the arid prairie to the shrubbery and poplar groves of Milk River Valley is also striking. From scattered individuals of a few species on the plains the change is sudden, to a rich fauna of many species, including such birds as goldfinch, hairy woodpecker, towhee, house wren, Arkansas kingbird, robin, nighthawk, pewee, oriole, chat, catbird, chipping sparrow, and yellow warbler.

The forests of conifers and aspens, of course, give a completely different avifauna. In the Cypress Hills, amongst others are oven-bird, veery, red crossbill, orange-crowned warbler, red-eyed vireo, cedar waxwing, Macgillivray warbler, junco, white-crowned sparrow; Audubon warbler, and red-breasted nuthatch, nesting in this island of forest, far separated by nearly the width of the province from the next forest area in the Rocky Mountains. This area might be considered a refugium, since it is unglaciated, and the avifauna a relic one, stranded there first by the ice, and later by the ecological barrier of the plains. But before too much theory is developed along these lines, comparative studies should be made of the older and more diversified plantations of trees on the plains, as at Brooks where Randall tells me even such Canadian zone species as the red-breasted nuthatch has nested. Thus, colonization of an isolated grove of trees on the plains is a possibility that might even explain the Cypress Hills being the northern outpost of the pink-sided junco (*Junco o. mearnsi*), and the northeastern outpost of the Oregon white-crowned sparrow (*Z.l. oeantha*).

The forests of the Rocky Mountains carry a large fauna that includes such species as Canada jay, Franklin grouse, Townsend warbler, Clark nutcracker, Oregon junco, fox sparrow, western tanager, and American three-toed woodpecker.

The alpine grassland above timber-line harbours at least white-tailed ptarmigan, and the leucosticte probably belongs here. Other species such as the golden-crowned sparrow and the timber-line sparrow will probably be found here.

SYSTEMATIC LIST

FAMILY—GAVIIDAE. LOONS

Common Loon. *Gavia immer* (Brünnich)

The common loon is usually given as occurring throughout Alberta in summer, and the subspecies that occurs is apparently a matter open to question.

Though the loon migrates commonly throughout the plains of southern Alberta (Randall, 1946, *Can. Field-Nat.*, 60, p. 123) it is apparently not a regular breeding bird outside of the mountains south of Battle River where it is uncommon, and it is absent from the southern plains.

In the mountains, it is recorded as a summer visitant as far south as Banff (Clarke and Cowan, 1945, *Can. Field-Nat.*, 59, p. 85); but, farther south, at Waterton Lakes, apparently only occasional non-breeding birds summer. In 1922, C. H. Young recorded one to four birds noted with fair regularity throughout the season, May 7 to September 7, spent in Waterton Lakes Park, but he summarized his observations as "very rare on Waterton and Lonesome Lakes. They flew across the lake but did not breed" (MS.). In 1945, in a 2-week stay in the park, in August, I saw a single bird only, an adult, on Lake Crandall, and Mr. de Veber, the superintendent, told me that to the best of his knowledge loons did not breed in the Waterton Lakes Park. This cannot be because of lack of food, for the fishing is good in the lakes and many of them are stocked with trout.

As to the subspecies occurring, I have no measurements of breeding specimens, but Taverner measured a mounted, unsexed, undated bird in Calgary, that was taken at Buffalo Lake. The measurements are: wing, 330 mm.; bill, 76 mm.; these are small enough to refer to the small prairie form *G. i. elasson* if it be recognized, but I have shown (1947, *Can. Field-Nat.*, 61, pp. 193-195) that it is impractical to do so despite differences in size of birds in various populations.

FAMILY—COLYMBIDAE. GREBES

Only a few grebes were identified during the course of the work. Taverner, in 1920, saw many birds at Elkwater Lake on August 6, and found Many Island Lake a water-birds' paradise on August 7; Pakowki Lake, on August 5, was very low and there were few water-birds. In 1945, Rand found water-birds very common in the Ducks Unlimited projects at Cassils and at Tilley, near Brooks; moderately common at Elkwater Lake; and a few scattered birds on artificial sheets of water elsewhere.

All grebes are, of course, extremely local in occurrence, and are absent from wide areas.

Little work was done with this group, and the following notes are extremely fragmentary, and lack of records does not necessarily mean absence of a species.

Holboell Red-necked Grebe. *Colymbus grisegena holböllii* (Reinhardt)

Evidently an uncommon, local species; breeding.

Taverner recorded a pair at Strathmore on July 30, 1920. They were on a small slough near the town, and acted as though they had young in the reeds. Young, in 1922, saw migrants in Waterton Lakes Park on May 27 and 29, and again on September 7.

Horned Grebe. *Colymbus auritus* Linnaeus

Probably a fairly common, local breeder.

Taverner, in 1920, found the species with young at Strathmore, July 29 and 30. In 1945, Rand identified one on the canal in Brooks on June 28, and Randall says they are fairly common there.

Young, in 1922, saw an adult on May 18 in Waterton Lakes Park, but saw no more until September 9 and 13, on each of which days he saw ten.

Specimens, National Museum of Canada:

Waterton Lakes Park: 1♂, 1♀ ad.; May 24, 1923; Young.

American Eared Grebe. *Colymbus nigricollis californicus* (Heermann)

This was the common grebe, nesting locally on the prairie sloughs and artificial bodies of water in 1945, though neither Young nor Taverner recorded it.

In a slough, well grown to reeds, near Cassils these birds appeared to be common and many with young were seen June 22-26, 1945, but because of the denseness of the vegetation, it was difficult to tell how many were present. On the newly constructed lakes near Tilley (Louisiana Lakes of Ducks Unlimited), which had little concealing vegetation, this grebe was very conspicuous on June 22, and Randall showed me one pond where he estimated there were over two thousand nests. Across the shallow water, the sitting birds on the exposed nests appeared to form a solid line. A ring-billed gull lit on one nest from which the grebe had left, and after picking up an egg in its bill, dropped it, and then ate it.

In the small lakes just north of the Cypress Hills, several of this species with young were identified among the small grebe population on July 10, 1945. Farther south, on the arid plains, the presence of grebes seems to depend on the few, scattered, irrigation reservoirs; several of this species with young were seen near the Dominion Range Station and the reservoirs along Sage Creek, near Wild Horse, July 17-25, 1945.

Western Grebe. *Aechmophorus occidentalis* (Lawrence)

Though known to occur in some numbers locally as at Brooks (Randall), neither Rand nor Taverner recorded this species, and Young saw only two on Waterton Lake, August 5, 1922.

FAMILY—PELECANIDAE. PELICANS

White Pelican. *Pelecanus erythrorhynchos* Gmelin

Taverner, in 1920, saw about two hundred pelicans on Many Island Lake on August 8. Rand, in 1945, saw only one pelican that lit in an irrigation pond near the road, near Brooks, though there was a colony at Lake Newell some miles to the south, according to Randall.

FAMILY—ARDEIDAE. HERONS, BITTERNs, ETC.

Great Blue Heron. *Ardea herodias herodias* Linnaeus

An uncommon summer resident, occurring even about marshes on the open prairie; reported to breed in the wooded edge of the Cypress Hills.

Taverner recorded none in 1920; Young, in 1922, in Waterton Lakes Park saw only one, on September 9.

In 1945, Rand, at Cassils, on June 24, saw one flying across the prairie. In the Cypress Hills, Mr. J. D. Champion told Rand he saw great blue herons occasionally about the marshes and lakes on the north and west sides of the hills; and Rand saw several there, July 5-11. An old-time rancher there, Mr. G. Armstrong, reported that a few years ago he saw a rookery containing sixty or seventy nests on the headwaters of Battle Creek, in the Cypress Hills. At the Dominion Range Station, one was seen flying over the open short-grass prairie on July 21, and two were seen flying up the tree-lined Milk River, near Comrey, on July 24.

Though we have no specimens from this area, two from adjacent areas, an immature from Morrin on Red Deer River, Alberta, and one from Cypress Lake, Saskatchewan, have the pale-coloured neck of this subspecies, which can be assumed to occupy the area. Their tarsal measurements are: Morrin, male, immature, 163 mm.; Cypress Lake, female, adult, 175 mm.

American Bittern. *Botaurus lentiginosus* (Montagu)

Taverner recorded two at Many Island Lake, August 8; and Rand found the species fairly common about the sloughs and irrigation ditches near Brooks, June 24-26, 1945. As with so many water-loving species, the distribution of this bird must always be local in this arid country.

FAMILY—ANATIDAE. DUCKS, GEESE, ETC.

On the southern prairie, the presence or absence of water-fowl depends on bodies of water. About Brooks, where the irrigation projects of the eastern irrigation district made reservoirs and ditches available, and Ducks Unlimited had improved a natural slough (called by them San Francisco Lake) near Cassils, by diverting more water to it, and near Tilley where they flooded a series of dry sloughs (called by them Louisiana Lakes), water-fowl swarmed, and thousands of ducks were sometimes in sight at one time; Lake Newell, to the south of Brooks, was not visited, but is said to swarm with water-fowl also. Randall (who showed Rand about this area) has published an account (1946, *Can. Field-Nat.*, 60, pp. 123-131) on the birds of the Brooks area. This report on data accumulated during his employment with Ducks Unlimited, over a period of years, gives the water-fowl status at that time in detail, and in the present report they will be only mentioned. Elsewhere than the Brooks area, only small concentrations of water-fowl were seen. On the small lakes just north of the Cypress Hills, a thousand ducks might be seen in a morning. South of the Cypress Hills only small numbers, apparently many of them non-breeding, were seen on the very scattered reservoirs made for cattle or irrigation. Taverner, who visited Many Island Lake in 1920, found it a water-fowl paradise.

It must be kept in mind that it is possible to pass within a few miles of a rich water-fowl breeding lake without being aware of it.

In general, outside the Brooks area, in 1945, and Many Island Lake in 1920, no important water-fowl nesting grounds were seen by Rand or Taverner, though it might be expected that Elkwater Lake, and the other small lakes on the north edge of the Cypress Hills, would have many more ducks than they had.

Whistling Swan. *Cygnus columbianus* (Ord)

In spring and autumn these swans migrate through this area, but occasionally lone, non-breeding birds spend the summer here.

Rigall told Rand (1945) that in an afternoon's drive about Pincher Creek in the spring one could see a thousand swans; and Mr. DeVeber told him that many swans stop on the lakes in Waterton Lakes Park in the spring.

Taverner, in 1920, saw a lone swan on Pakowki Lake, August 5, that he assumed was a non-breeding bird. Young, June 5, 1922, had a report of six seen on this date in Waterton Lakes Park.

These birds are tentatively referred to this species.

Canada Goose. *Branta canadensis* subsp.

Though geese are known to nest locally in this area, the only record secured by the Museum parties was that of Young, who saw eight on June 24, 1922, in Waterton Lakes Park. He was told by Mr. Knight that they had bred in the park, and Superintendent Le Capelain reported their presence there on February 3, 1940.

Though we have no specimens from the immediate area for comparison we have two females from Cypress Lake (June 2, 11) to the east, and an adult in moult from Red Deer River, just to the north. These would be expected to be *B. c. moffitti* Aldrich. However, the measurement, wing, ♀ ad., 478 mm., is not diagnostic, and the paler colour of these summer skins, compared with winter specimens of *B. c. canadensis* from eastern Canada may be the result of wear.

Common Mallard. *Anas platyrhynchos platyrhynchos* Linnaeus

About the irrigation projects and the marsh reclamations of Ducks Unlimited near Brooks the mallard was very common and breeding in 1945, June 22-26, and many hundreds were seen in a morning. On the little lakes just north of the Cypress Hills, the species was fairly common, and from six to one hundred were seen on one pond in a morning, June 6-10; south of the Cypress Hills only very scattered irrigation waters are suitable for ducks and there this species breeds. Several to a dozen or so were seen on the reservoirs about the Dominion Range Station, Sage Creek, near Wild Horse; and three were seen in Milk River near Comrey, July 14-24; small downy young were seen as late as July 14.

In Waterton Lakes Park, in 1945, twenty were the most seen in one day, July 31 to August 10. Young, in 1922, recorded a few in the spring, and fairly common in the autumn, with none recorded from June 23 to August 5, indicating that they are much more common in the park in migration and that the breeding population is small.

Taverner, in 1920, found the mallard to be the commonest duck, generally distributed.

We have one specimen from this area, a female taken on Milk River by Soper, June 29, 1927.

American Pintail. *Anas acuta tzitzihoa* Vieillot

This was another very common breeding species in the Brooks area in 1945, June 23-26, hundreds being seen in a day; broods in evidence and males going into eclipse. On the little lakes just north of the Cypress Hills, twenty to thirty of this species were the most seen in a day in early July, and farther south a few were seen about the reservoirs at the Dominion Range Station and Sage Creek, where twenty was the most seen about one reservoir, and one brood of one-third grown young was seen July 17. At Waterton Lakes Park only two were seen on August 1, 1945; and Young recorded a few in June, August, and September, 1922. Taverner recorded this species as common on all duck grounds visited in 1920.

Green-winged Teal. *Anas carolinensis* Gmelin

Although a common breeding species in the Brooks area in 1945, few were seen elsewhere; two in female plumage were identified on a pond on the north edge of Cypress Hills on July 10. Taverner, in 1920, recorded it only twice in our area: one that had evidently killed itself against a wire near Strathmore on August 2, and one at Elkwater Lake on August 7; the only Waterton Lakes Park records are six seen on September 9 and six on September 12, 1922, by Young.

Blue-winged Teal. *Anas discors* Linnaeus

In the neighbourhood of Brooks in 1945 this was one of the common breeding ducks, June 22-26, both young and eggs being seen; on the little lakes north of the Cypress Hills, July 6-12, eight or ten were the most identified on one lake, and one brood of about six young was seen on Elkwater Lake; farther south, small groups up to six in number were seen on reservoirs about the Dominion Range Station and Sage Creek, but no young were seen July 14-20.

Taverner, in 1920, considered this duck and the mallard the commonest in southern Alberta. He recorded a brood of newly hatched young at Strathmore on August 1. In Waterton Lakes Park, Young saw several in August and September, 1922.

Gadwall. *Anas strepera* Linnaeus

This was a fairly common breeding species in the Brooks area, June 22-26, when it was still usually in pairs and nests with eight and nine eggs were seen; elsewhere only three were seen, in a little pond on the north edge of the Cypress Hills.

In Waterton Lakes Park, Young saw two, in June and in August, 1922.

Baldpate. *Mareca americana* (Gmelin)

A very common breeding duck in the Brooks area, June 22-26, 1945, when hundreds were sometimes in the air at one time.

In the little lakes on the north side of the Cypress Hills the baldpate was well represented on most of the sloughs; where ten was the most seen on any one slough, and several broods of small young were seen July 10, 12. Farther south, it was one of the commonest species on the scattered reservoirs. Several score were seen in a flock on one reservoir near the Dominion Range Station, and broods of three to six small young were seen there July 17.

Shoveller. *Spatula clypeata* (Linnaeus)

A common breeding species in the Brooks area in 1945, nests with eggs being found June 24-26; elsewhere it was much less common, only two being identified in the sloughs north of Cypress Hills, July 10, and several adults and two broods of four and eight young in the reservoirs near the Dominion Range Station, July 25.

Redhead. *Aythya americana* (Eyton)

A common breeding species about the sloughs in the Brooks area, where nests and young were seen, June 22-26, 1945, but not seen elsewhere.

We have one specimen from the area, taken August 8, 1881, at Medicine Hat by J. Macoun.

Canvas-back. *Aythya valisineria* (Wilson)

Though Randall considered this species to be a fairly common breeding bird in the Brooks area in 1945, only one was seen elsewhere, near the Dominion Range Station, where on July 17, 1945, one flushed with a flock of about one hundred and fifty other ducks.

Lesser Scaup Duck. *Aythya affinis* (Eyton)

A very common breeding bird in the Brooks area in 1945, where nests containing five, eight, nine, nine, and nine eggs were seen in grass bordering the sloughs June 22-26.

A few were seen in the sloughs on the north edge of the Cypress Hills, July 6-10, 1945, fifteen being the most seen on any one body of water. The species was not seen farther south.

In Waterton Lakes Park in 1922, Young saw a few in June and in September.

Barrow Golden-eye. *Glaucionetta islandica* (Gmelin)

Evidently a common breeding species in Waterton Lakes Park, where Young in 1922 recorded "pretty common in the spring. They breed at Waterton and Lonesome Lakes. On the 25th of May I found a nest in a hole up in a tree about 20 feet from the ground. There were 11 eggs in it. As I was waiting for more eggs to be laid a crow robbed the nest and ate the eggs." Young's records show the species was common daily up to the end of June. Through July only singles were observed, but there were greater numbers recorded August 10-19, when again fewer were seen.

In 1945, females with broods of six, two, and two were seen, July 31 to August 3, on lakes and ponds in the park, and four adults in female plumage were seen on August 10.

The references of all these individuals to the present species is on the basis of probability in view of specimens collected.

Specimens:

Waterton Lakes Park: 1 ♂ ad., 2 ♀ ad., 5 downy young; May 16-July 4.

Buffle-head. *Glaucionetta albeola* (Linnaeus)

This is a species that nests in holes in trees, and the few summering individuals in the Brooks area are evidently non-breeders: three males and four females were seen on the lakes near Tilley on June 22, 1945. In the little lakes on the north edge of the Cypress Hills, July 5-10, one male and six females were seen in all, and it is possible they could breed there, though no young were seen.

Western Harlequin Duck. *Histrionicus histrionicus pacificus* Brooks

Apparently an uncommon breeding species on the mountain streams on the east slope of the Rockies; in Waterton Lakes Park, in 1922, Young saw a drake on May 15, and on September 5 he saw a female with four nearly grown young on a creek.

Specimens:

Waterton Lakes Park: 2 ♂ ad., 1 imm.; June 12, Sept. 5; culmen 26, 28.5 mm.

These males, and others from British Columbia, Yukon, and one from the Slave River Delta (August 22, 1914), are lightly but fairly well differentiated from a series from south Baffin Island, Gulf of St. Lawrence, Grand Manan, and Great Whale River (September 2, 1927) in the average paler chestnut head stripe that does not come as far forward over the eye, and the larger and average longer bill. The measurements of the culmen of the above two series are:

H. h. histrionicus (9) 25-26.5 (av. 25.5)
H. h. pacificus (10) 26-28.5 (av. 27.1 mm.)

These measurements, allowing for the disappearance of small feathers from the base of the bill through wear, do not show so great a difference as do Phillip's measurements.

White-winged Scoter. *Melanitta fusca* subsp.

Though Randall said the species nested in the Brooks area, none was seen until July 6, 1945, at Elkwater Lake, when three birds in faded plumage were seen swimming, and a lone bird was seen there again on July 12.

Ruddy Duck. *Oxyura jamaicensis rubida* (Wilson)

The ruddy duck was a common breeding species in the Brooks area in 1945, June 20-26; elsewhere only two were seen on Elkwater Lake, July 6.

American Common Merganser. *Mergus merganser americanus* Cassin

Young writes that in 1922 he saw mergansers fairly commonly flying over from south to north in Waterton Lakes Park in May, but no more were seen until late August and September.

In the light of specimens collected, these records are all referred tentatively to this species, though some red-breasted merganser records may be included.

Specimens:

Waterton Lakes Park: 1 ♂ ad., 1 ♀ ad.; May 13, 30.

FAMILY—ACCIPITRIDAE. KITES, HAWKS, ETC.

Eastern Goshawk. *Accipiter gentilis atricapillus* (Wilson)

Records of the goshawk were obtained only in the Waterton Lakes Park by Rand in 1945. On August 6, a juvenile was seen, and on August 11, in a heavy spruce forest in Upper Pass Creek, two juveniles screamed at our intrusion, and one of them came flying over to perch in a tree overhead and peer down at us. From the forest its voice came as a loud, broken, squeal or harsh scream, but in flight it was the quickly repeated scolding call. Elsewhere in the northwest, I have seen young goshawks approach a human in the forest, scream at him, and even follow him through the forest, flying from tree to tree.

Eastern Sharp-shinned Hawk. *Accipiter striatus velox* (Wilson)

As would be expected, this species is absent from most of this treeless country of southern Alberta during the summer. Taverner saw none in his 1920 travels. That it may be a summer resident in the Cypress Hills is indicated by one seen there July 7, 1945, by Rand.

In Waterton Lakes Park, in 1922, Young reports a few seen in May, June, and July, and fairly common in migration in August and September.

Specimens, National Museum of Canada:

Waterton Lakes Park: 1 ♂ ad. [= ♀]; Sept. 10, 1922.

This compares well with birds from eastern Canada.

Cooper Hawk. *Accipiter cooperii* (Bonaparte)

Evidently a scarce summer bird in southern Alberta, as only three records were made, all by Young, in Waterton Lakes Park, in 1922; one seen on June 2, and an adult male taken May 28, and an immature female taken September 10.

In view of the scarcity of this species in Alberta, it may be well to list the other Alberta specimens in the collection: an immature female, and an adult male, from Jasper, August 28, 1918, and September 6, 1917, and a female from Banff Park, August 15, 1945. One other sight record for Banff Park was made, September 4, 1945, when Rand saw one in Sunwapta Pass in open spruce, just near timber-line.

Red-tailed Hawk. *Buteo jamaicensis* subsp.

In view of the abundance of this hawk on Red Deer River as reported by P. A. Taverner in 1919 (Auk, 36, pp. 15, 16), it was surprising that Rand made only two observations in the Cypress Hills (one collected, and a pair screaming as though about a nest, July 9); and made no definite records elsewhere during the summer, though some of the few *Buteo*-type hawks seen in Waterton Lakes Park in August may have been of this species. Young, in 1922, in Waterton Lakes Park, shot one on June 30, and saw a few in August.

Specimens, National Museum of Canada:

Cypress Hills: 1 ♀ ad.; July 3, 1945.

Waterton Lakes Park: 1 ♀; June 30, 1922.

Taverner (1927, Victoria Memorial Museum, Bull. 48; and 1936, Condor, 38, pp. 66-71) has discussed in detail the large series in the National Museum from Red Deer River, and showed there was great variation in plumage of breeding birds: *krideri*, *borealis*, *calurus*, and *harlani* types all breeding on Red Deer River.

Of the two new specimens, the Cypress Hills adult female, evidently a non-breeder, is of pale *borealis* type with red tail, but with distinct barring on the two outer tail feathers, and indistinct barring on the others. The Waterton Lakes specimen is moulting into adult plumage, and in its dark coloration (but not melanistic) and dark red tail with incomplete barring on all rectrices is similar to British Columbia *calurus*.

It seems doubtful that *harlani*, the black-plumaged bird with a marbled tail, is more than a colour-phase of this species, and the birds of southern Alberta are not plainly referable to any subspecies but represent an area of intergradation between *calurus*, *krideri*, and *borealis*.

Swainson Hawk. *Buteo swainsoni* Bonaparte

In 1920, Taverner found Swainson hawk common and widely distributed on the prairies, where it took the place of the red-tailed hawk that inhabited the wooded country.

In 1945, however, Rand found the species not common. About Brooks, where "gophers" (*Citellus*) were common, only one was seen, June 22-29, though Randall pointed out a nest that had been occupied the year before. About the Cypress Hills, July 5-13, birds were recorded on only six occasions, singly or in pairs (ten birds in all).

About the Dominion Range Station itself, where "gophers" (*Citellus*) were almost absent, this species was scarce, July 14-25. There was one nest in an isolated clump of trees by a reservoir, with one young and one egg in it on July 15, and aside from the pair belonging to this nest, only three other birds were seen during extensive driving over the prairie. On Sage Creek, near Wild Horse, however, where "gophers" were common, I found this hawk more common, and four were seen on the morning of July 25.

In September, while motoring widely over the plains from Milk River to Medicine Hat, only one was definitely identified, on September 24, near Medicine Hat.

At Waterton Lakes Park, Young, in 1922, saw examples of this species occasionally during the summer; and Rand saw one or two there almost daily, August 1-11, 1945, in the grass country, and on the edge of the forest in the lowlands.

Specimens, National Museum of Canada:

- Waterton Lakes Park: 2 ♂, 3 ♀, 1 sex (?); May 18-Sept. 15, 1922, and Aug. 11, 1945; Young, Rand, and Clemens.
- Eagle Butte: 1 ♀; July 30, 1927; Soper.
- Bassano: 1 ♀; Aug. 1, 1920; Taverner.
- Dominion Range Station: 1 ♂ nestling; July 25, 1945; Rand.
- Milk River: 1 ♂, 1 ♀; July 20, Aug. 15, 1923; Williams.

Ferruginous Rough-legged Hawk. *Buteo regalis* (Gray)

In 1920, Taverner recorded this hawk as a common species on the open prairie, again in contrast to Rand's experience in 1945. In the latter year only two were seen in the Brooks area (June 28 and 29); a pair seen on the Cypress Hills, July 7; and one just to the south, July 13. In the vicinity of the Dominion Range Station, south to Milk River, and east to Wild Horse, where the badlands provided abundant nesting places, only six were seen, July 19-25.

In September when motoring over the plains, many were seen in migration. Between Brooks and Medicine Hat, September 24, fourteen were seen, and between Medicine Hat and Foremost, Rand saw eighteen on September 25.

Specimens, National Museum of Canada:

Macbeth: 1 ♂; August 1, 1920; Taverner.

Milk River: 1 ♂ ad., 4 nestlings; June 28, 1927; Soper.

American Golden Eagle. *Aquila chrysaetos canadensis* (Linnaeus)

Evidently common in migration in the Waterton Lakes Park area, where a few summer; no records were made elsewhere though it probably occurs throughout in winter.

In 1922, Young, in Waterton Lakes Park recorded two in May, one on June 9, and one on September 4. In 1945, Rand and Clemens saw two on July 30, and one on August 8. They were told by Mr. F. H. Rigall that he had seen twenty-three in the air at one time, just north of the park.

Bald Eagle. *Haliaeetus leucocephalus* subsp.

In 1922, Young was told the species used to breed in early April in Waterton Lakes Park, and he saw one that was mounted and exhibited in one of the hotels there. It had been shot in the spring of 1921.

American Marsh Hawk. *Circus cyaneus hudsonius* (Linnaeus)

Taverner, in 1920, summarized his records for this species in southern Alberta as "the commonest hawk on the prairies, seen nearly everywhere." Rand, in 1945, found the species widely distributed over the open prairie from Brooks to Milk River, but it was hardly common, usually only one or two being seen in a day, June 22 to July 25, and considering the amount of country covered by motor car, the species would be rated as not uncommon. In the southeast corner of the province, on Sage Creek, a pair came chattering overhead, in the edge of a hay field, indicating breeding, July 25.

In Waterton Lakes Park, in 1922, Young saw none until early August when migrants appeared, going south. In 1945, Rand and Clemens saw several in the grasslands at the foot of the mountains, August 4-13.

Specimens, National Museum of Canada:

Cassils: 1 ♀ ad.; June 26, 1945; Rand and Clemens.

American Osprey. *Pandion haliaetus carolinensis* (Gmelin)

Apparently not uncommon in summer in the Waterton Lakes Park area; Young, in 1922, was told they used to be common and breed there, and he saw a few, July to September. In 1945, Rand and Clemens saw two, August 1-14.

We have one specimen in the collection, from this area, taken April 30, 1894, by W. Spreadborough at Medicine Hat.

FAMILY—FALCONIDAE. FALCONS, ETC.

Prairie Falcon. *Falco mexicanus* Schlegel

Taverner in 1920 found the prairie falcon fairly common and well distributed, and collected a specimen at Wisdom. In the summer of 1945, Rand and Clemens saw only two large falcons, probably this species, between Brooks and Milk River (on July 3 at Cypress Hills, and July 20 near Milk River). Later, in September, two were seen on September 24 near Medicine Hat, perched on telephone poles along the road.

Young in 1922 recorded none in Waterton Lakes Park, but Rand and Clemens saw a falcon there on August 9 that flew by at close range and seemed to be this species.

Specimens, National Museum of Canada:

Wisdom: 1 ♀; August 3, 1920; Taverner.
Milk River: 1 ♀ (?); June 24, 1927; Soper.

American Peregrine Falcon. *Falco peregrinus anatum* Bonaparte

The only record made was Young's sight-record of a bird just east of Waterton Lakes Park, June 24, 1922.

Richardson Pigeon Hawk. *Falco columbarius richardsonii* Ridgway

Evidently scarce over most of the prairies of southern Alberta and probably restricted to the few wooded areas as the records indicate. Taverner in 1920 recorded one near Medicine Hat on August 2, and a parent and young on the edge of the Cypress Hills, August 6.

In 1945, in the Cypress Hills, Clemens shot a non-breeding male that was just moulting into the blue-backed plumage, characteristic of this pale form, as are the two specimens Spreadborough collected there, an adult male and a female, June 26, 1894.

Eastern Sparrow Hawk. *Falco sparverius sparverius* Linnaeus

Taverner found the sparrow hawk "common practically everywhere" and collected a specimen near Manyberries. Rand and Clemens, however, in 1945, saw the species only on three occasions between Strathmore and Milk River, June 22 to July 25: two were seen along the road near Strathmore, June 22; two were flushed on the open prairie near the Dominion Range Station, July 13; and one was seen nearby in the badlands of Lost River, July 17.

In Waterton Lakes Park, Young, in 1922, saw a few from May to July, and they were very common in migration in August and September. In 1945, several were present on the edge of the grasslands, August 6-12.

Specimens, National Museum of Canada:

Medicine Hat: 2 ♂; April 10, 1894; Spreadborough.
Manyberries: 1 ♀ (?); August 5, 1920; Taverner.
Waterton Lakes Park: 1 ♂; May 22, 1922; Young.
Wing, flattened, male adult, 194, 195, 196 mm.

Bond (1943, Condor, 45, pp. 172, 173) has pointed out that Alberta birds average larger than those to the west and south, and the above measurements are larger than the average (187.79 mm.) of his large series of birds from western United States and Canada.

FAMILY—TETRAONIDAE. GROUSE AND PTARMIGAN

Richardson Dusky Grouse. *Dendragapus obscurus richardsonii* (Douglas)

In this area, found only on the east slope of the Rockies, where it is common. Young, in 1922, recorded it as seen everywhere in Waterton Lakes Park, from the top of Sheep Mountain to lake-level; in July and August several broods were seen, and he counted thirty-one birds feeding on mountain berries. In 1945, Rand and Clemens found the species fairly common in August. Females with young were seen in meadows and regrowth at a wide variety of altitudes from lake-level to near timber-line, July 28 to August 10, the broods varying in size from one to five young. Only one male was seen, about halfway up Mount Crandall, in a large area of young pine regrowth, where there were many moulted feathers of this species scattered through the shrubbery.

We have two males and two females from Waterton Lakes Park, and a male and female from Coleman. The males compare well with Atlin and Teslin Lake specimens, as do the Waterton Lakes females. The Coleman female is paler above, and taken by itself compares better with females from Spences Bridge and Osoyoos that should be *pallidus*. In the present state of our knowledge, it seems better to consider all these birds as *richardsonii*, which ranges through Banff (Swarth) and Jasper (one female, National Museum, Canada).

Franklin Grouse. *Canachites franklinii* (Douglas)

Only found in the coniferous forest of the east slope of the Rocky Mountains, where Young collected two in Waterton Lakes Park in 1922, but Rand and Clemens saw none in 1945.

Grey Ruffed Grouse. *Bonasa umbellus umbelloides* (Douglas)

Recorded only in the forests of the Cypress Hills, and in the wooded country of the eastern Rocky Mountains.

George Armstrong of Elkwater, long-time rancher in the area, told Rand and Clemens that originally there had been no ruffed grouse in the Cypress Hills, and about 20 years ago he had been instrumental in getting sixteen from the vicinity of Red Deer, Alberta, and introducing them. They have done well in this area and are firmly established. In the autumn of 1943 the species was very common, according to Mr. J. D. Champion, and in a walk of 10 minutes from his station he would see several of these birds. In 1945 the species was very scarce and not one was seen, though old signs were noted and Champion reported one female with a brood near his station. The Cypress Hills is a preserve in which there is no hunting.

In 1922, Young found the species common in Waterton Lakes Park, where he saw individuals daily. He notes that in May they were very tame, and in July and August heard them drumming.

Though we have no specimens from this locality, the area lies in part within the range of *umbelloides* as outlined by Aldrich and Friedmann (1943, Condor, pp. 87, 93) and Snyder and Shortt (1946, Can. Jour. Research, 24, p. 122), and in part (Cypress Hills) has been stocked with birds from the range of *umbelloides*.

Northern White-tailed Ptarmigan. *Lagopus leucurus leucurus* (Richardson)

Found only above timber-line in the Rocky Mountains, where it is common. In 1945 Rand and Clemens found a female with five half-grown young near Cathew Lakes, in Waterton Lakes Park, August 9. Mr. F. H. Rigall showed us a picture of this species, in which one was crouching in a trough it had dug in the lee of a snowdrift, which, he says, is their customary method of taking shelter in a storm. Rigall said the birds were common above timber-line just north of Waterton Lakes Park, and spoke of seeing one flock of sixty birds.

The female and young mentioned above were collected, and all had the crops filled with leaves and a few seeds. The adult, wing 167 mm., is in the barred summer plumage, and adult and young agree well with Banff and Jasper birds in similar plumage.

Greater Prairie Chicken. *Tympanuchus cupido pinnatus* (Brewster)

Our only unpublished record for this area is a manuscript note from Dr. C. H. D. Clarke that he saw two on August 28, 1939, just outside Waterton Lakes Park.

The name *T. c. pinnatus* replaces *T. c. americanus* (1944, Auk, vol. 61, p. 446).

Prairie Sharp-tailed Grouse. *Pedioecetes phasianellus campestris* Ridgway

Apparently common some years, scarce others, locally in areas of brush on or bordering the plains; scarce or absent from great stretches of open prairie. Taverner in 1920 did not see this species in his rapid traverse of the southern part of the province and comments that they do not seem to have recovered from the setback of a few years ago. In 1945 Rand and Clemens found the species fairly common, singly, in pairs, or with broods, in the brushy areas throughout the Cypress Hills, July 3-7. One brood of six small young was seen with the parent, July 4. Champion told us that he estimated the year's population as fair; and that broods seemed to be doing well, as five to twelve young was the common number, and he had seen one brood of fifteen. Last year the broods were much smaller he said, when broods of one and two were not uncommon.

While watching the female with her brood on July 4, the female was quite demonstrative, at first giving a whining note, then cackling and gabbling, as she strutted about trying to distract me from her chicks. This brought a crow flying over, and then a coyote came galloping up to investigate, coming within a few yards before noticing me.

The only other place we saw this species was near the Dominion Range Station, where nine adult birds were flushed from the wolf-willow shrubbery along the valley of Lost River, July 17, 18. One bird, when collected, was found to have the plumage of the posterior part of the body carrying many of the "spears" of spear grass, apparently without ill effect.

In Waterton Lakes Park, Young saw only a few during the summer of 1922; two adults on May 18, and full-grown broods on September 9 and 12. Later, on September 22, he saw one hundred birds flying from the west across Waterton Lake to the east side. Rand and Clemens saw none, but park employees told us there were a few present in the shrubbery along the edge of the prairie.

Specimens from Waterton Lakes (Young), Medicine Hat (Spreadborough), and Cypress Hills and the Dominion Range Station compare well with available material of this race from southern Saskatchewan and Manitoba. Friedmann (1943, Jour. Wash. Acad. Sci., 33, p. 191) has separated these western birds as *P. p. jamesi* Lincoln, but the difference in our material is very slight:

Sage Hen. *Centrocercus urophasianus* (Bonaparte)

Common locally in the sage-brush areas in the extreme southeast part of the province, north nearly to the Cypress Hills, to which an occasional bird straggles, and west at least to Manyberries.

Champion told us that this species was found some 10 to 12 miles south of the Cypress Hills and that a year earlier (August 1944) he saw a lone bird, evidently a wanderer, actually in the Cypress Hills. About Manyberries, we were told, the species was not uncommon in sage-brush flats. At the Dominion Range Station, H. Hargrave told us the species bred in the nearby sage flats. We hunted these restricted flats, and on July 14 we found two adults; July 16, one female with five half-grown chicks; and on July 23 flushed a flock of ten birds, apparently all adults, outside the sage, in the low grass on the edge of a wheat field.

On Sage Creek, near Wild Horse, where the sage areas are much more extensive, this species is said to be common, and flocks of three hundred to four hundred are seen in the winter. Rand and Clemens visited it on July 25 and saw five birds in a flock. From the old signs, including droppings, that were common especially where the sage was tall and dense, it appears that they sleep in the centres of clumps of sages, probably during the winter.

Two specimens were collected near the Dominion Range Station.

FAMILY—PHASIANIDAE. PHEASANTS, QUAIL, ETC.

European Grey Partridge. *Perdix perdix perdix* (Linnaeus)

Taverner in 1920 saw a flock of seven near Strathmore on August 1, and was told they were doing well since their introduction, and in certain localities near Calgary were numerous enough to provide considerable sport.

In 1945 Rand saw six in the Brooks area June 22-29 and was told they were fairly common generally in the Medicine Hat-Brooks area. About the Cypress Hills they were well established, occurring even in the open country on top of the hills according to Mr. J. D. Champion. In the open prairie country to the south, Hargrave told us they were also well established and fairly common about the Dominion Range Station, even out to the open prairie, but they did not range many miles from water. During our stay here, two couples, one single, and one adult with four or five young, were seen, all in the denser vegetation around impounded bodies of water, July 15-20. Corporal Ridley of Coutts told us that in general in the Milk River country to the east the peak in numbers of this species was in 1935-36; since then they decreased rapidly in numbers, and now were scarce.

The following information from our files may be put on record here, as bearing on the history of the species. Mrs. Ethel Webster, Rosebeg (south of Medicine Hat) in letter, March 16, 1926, writes: "The Hungarian Partridge are coming here, but are not increasing at any special rate."

Common Pheasant. *Phasianus colchicus* subsp.

Neither Taverner (1920) nor Young (1922) mentioned the pheasant, but in 1945 Rand was told that Brooks was an important pheasant-shooting centre; attracting gunners from a wide area. Though he saw only a few birds in June, he was told they were very common even out on the bald prairie, but were most common about the irrigation projects so plentiful in that area. In the Cypress Hills area Mr. J. D. Champion told us the pheasant does not do well, though seen occasionally.

On the open prairie to the south there are few pheasants. Mr. H. Hargrave of the Dominion Range Station told us that none was settled there; three males were seen about the station in the autumn of 1944, but he said they soon disappeared.

In the shrubbery along Milk River itself, and about Wild Horse, where there is considerable irrigation carried on, the pheasant is said to be common, and Rand saw several along Milk River, July 20 and 21. At Coutts we were told that although perhaps a few pheasants had reached Milk River from other areas, George Ross introduced a number of birds on his ranch east of Coutts in the late nineteen-thirties and it is currently believed the present population stems from that stock.

FAMILY—RALLIDAE. RAILS

Sora Rail. *Porzana carolina* (Linnaeus)

Probably of local occurrence as a summer resident, wherever there is suitable marsh, but recorded only by Young in 1922 at Waterton Lakes Park, where individuals were seen in thick willow brush, and by Taverner who identified one at Caruso (3 miles west of Strathmore) on July 29, 1920.

American Coot. *Fulica americana americana* Gmelin

Common locally as summer resident throughout on suitable larger sloughs and impounded waters; absent over wide areas.

Taverner, in 1920, found the coot common in all suitable localities and saw large numbers on Many Island Lake on August 9. Rand and Clemens, 1945, found the species very common on the waters about Brooks, with many small young, June 23-26; it was also common on the little lakes on the north edge of the Cypress Hills. Farther south, on the open prairie with its infrequent reservoirs, only a few were seen about the ponds on the Dominion Range Station.

In Waterton Lakes Park, Young, in 1922, saw a few in May and August, and large flocks of from fifty to one hundred birds in September.

FAMILY—CHARADRIIDAE. PLOVERS

Several species not recorded occur in migration, and field work done later in the year on the prairie would undoubtedly have added several more species to the list.

Killdeer Plover. *Charadrius vociferus vociferus* Linnaeus

Common about sloughs and impounded waters of all the open country; having less rigid habitat requirements than many of the shore birds, it is more widespread, and is sometimes found some little distance from water, on the prairies.

Taverner, in 1920, found this species common in his traverse of southern Alberta, as did Rand and Clemens in 1945. It was one of the common, noisy shore birds along the shore of any little slough or marsh in the Brooks area, June 22-26, 1945, where six or eight adults might soon be running ahead of one; partly grown young were common, and one nest with four fresh eggs was found. The species was also seen intermittently from the prairie roads where water was not in sight; it was fairly common about the little lakes on the north edge of the Cypress Hills, July 5-12; and in the Dominion Range Station, Wild Horse area, wherever there was a bit of water on the arid plains, a few of these birds and downy young were seen, July 13-24. On September 24, near Redcliff, during a violent snowstorm, two were seen on the prairie.

Young, in 1922, recorded the species near Pincher Creek in June and August, but did not find it in the park, where Rand and Clemens saw three, July 31, on the shores of a small lake in the eastern edge of the park.

FAMILY—SCOLOPACIDAE. SNIPE AND SANDPIPERS

As with the plover, more work, later in the season, would undoubtedly have shown many additional species of shore birds as migrants.

Upland Plover. *Bartramia longicauda* (Bechstein)

Uncommon summer resident; recorded breeding; apparently not found on the open, short-grass prairie itself except near sloughs, but found where herbaceous vegetation was locally denser; sometimes a distance from water.

In 1920, Taverner noted only scattered individuals in a few places during his crossing of the province, as follows: Caruso, July 30 (one seen); Strathmore, August 2 (one seen).

In 1945, Rand and Clemens saw three in the Brooks area, June 23-25; saw one near Elkwater, June 29; and a group of four adults and one downy young on the shrubby bench country on top of the Cypress Hills on July 7, when an adult and one young were collected.

Northern Long-billed Curlew. *Numenius americanus parvus* Bishop

In 1945 a rather uncommon bird that seemed to favour the open prairie as much as it did the sloughs. Apparently commoner in 1920.

Taverner recorded a flock of one hundred near Medicine Hat, August 2, 1920, and the next morning, on the dry flats of the river valley near the city, saw a flock of about twenty-five feeding on the arid ground in the sparse, dry grass, sage brush, and cactus. On August 6, he saw thirty between Manyberries Creek and Elkwater Lake, and on August 8, at Many Island Lake found a flock of one hundred feeding on the dry foxtail grass flats near camp.

Rand and Clemens saw few by comparison, in 1945: five in the Brooks area, June 22-26; seven on the 18-mile drive from Irvine to the Cypress Hills (including a half-grown young), June 29; and a lone bird walking about by itself far out on the arid prairie near Milk River, July 20.

Specimens are in the collection from Many Island Lake (Taverner); Dominion Range Station and Irvine (Rand and Clemens).

Marbled Godwit. *Limosa fedoa* (Linnaeus)

A summer resident; breeding; common locally about the larger bodies of water on the open prairie.

Taverner in 1920 saw one at Caruso and Strathmore July 30, 31; two between Strathmore and Medicine Hat, August 1; two at Pakowki Lake, August 5; and very common at Many Island Lake where he saw about one hundred on August 7.

In 1945, Rand and Clemens found this species common in the Brooks area, June 22-26. It was one of the conspicuous, noisy marsh birds, and it was usual to have three or four scolding overhead most of the time, when walking along the slough margins. Several times young, one-third to one-half grown, were seen during this period. Not seen elsewhere.

Greater Yellow-legs. *Totanus melanoleucus* (Gmelin)

A migrant: Taverner, in 1920, saw six near Manyberries Creek on August 5.

Lesser Yellow-legs. *Totanus flavipes* (Gmelin)

Probably a common migrant over the whole area, stopping wherever water is available.

Taverner, in 1920, saw six birds near Manyberries Creek on August 5. In 1945, Rand and Clemens first saw the species on July 10, when one bird was seen on a little pond just north of the Cypress Hills; next seen on July 17 when six were seen on the edge of a reservoir near the Dominion Range Station, and several were seen there again on July 19.

Our only Waterton Lakes Park area record is ten seen on August 5, 1922, just outside the park, by Young.

Solitary Sandpiper. *Tringa solitaria* Wilson

Two subspecies of the solitary sandpiper occur in Alberta: one as a breeding bird and one, which breeds farther north, as a migrant. It is impossible at the present time to say whether there are differences in dates of migration of the two forms. Most specimens are readily distinguishable in the hand and one of the problems for local workers is, by judicious collecting, to work out the differences in occurrence of the two forms.

In 1945, Rand and Clemens found this species as a migrant about the marshy margins of reservoirs near the Dominion Range Station, where from one to six were seen on several days between July 14 and July 20; Young in 1922 saw only two in Waterton Lakes Park.

A summary of the birds in the National Museum, and the recent surveys of the species by Taverner (1940, Condor, 42, pp. 215-217) and Conover (1944, Auk, 61, pp. 537-544) as they affect Alberta, is given below under subspecies.

Eastern Solitary Sandpiper. *Tringa solitaria solitaria* Wilson

A common summer resident locally in Alberta from the northern border south to Didsbury and Calgary; in migration through the southern part of the province; actual breeding localities are Didsbury, Camrose, Henry House, Belvedere.

Specimens, National Museum of Canada:

Wood Buffalo Park: 3 ♂, 4 ♀; June 14-July 25; Soper.

Lac la Nonne: 12 ♂, 2 ♀; June 5-Sept. 3; Harrold, Laing, and Taverner.

Eagle Butte: 1 ♂, 1 ♀; July 23, 24; Soper.

Western Solitary Sandpiper. *Tringa solitaria cinnamomea* (Brewster)

In migration, probably throughout the province.

Specimens taken in spring, May 11, and in summer, July 2 to August 21.

Specimens, National Museum of Canada:

Lac la Nonne: 4 ♂, 4 ♀; July 2-August 21; Harrold, Laing, and Taverner.

Edmonton: 1 ♂; May 11, 1897; Spreadborough.

Jasper Park: 2 ♂, 3 ♀; July 22-August 4, 1917; Spreadborough.

Red Deer River: 2 ♂; July 30; Harrold.

Spotted Sandpiper. *Actitis macularia* (Linnaeus)

The prairie and its sloughs are not attractive to this sandpiper and only a few summer there. From Brooks to the southeast corner of Alberta the species was recorded only four times by Rand and Clemens, each time a lone bird, as follows; Brooks, one, July 28; Cypress Hills, one, July 10; Dominion Range Station, one, July 19, and nearby Milk River, one, July 21.

Along the rocky waterways of the foothills and the mountains to the west, however, the species becomes common; Young recorded it in Waterton Lakes Park from May to September in 1922, and Rand and Clemens found it fairly common there along the waterways up to Cameron Lake, July 31 to August 9, 1945.

Western Willet. *Catoptrophorus semipalmatus inornatus* (Brewster)

Common summer resident, breeding, where water is present in some quantity; scarcer where ponds are small and infrequent. Taverner found the willet common practically everywhere in southern Alberta on his traverse in 1920. In 1945, Rand and Clemens found this species a common, noisy bird of the edges of the prairie sloughs in the Brooks area, with downy young running about, June 22-26; it was not uncommon to have six or more birds scolding about one while walking along the edge of a slough. About the little lakes just north of the Cypress Hills it was also common, and the most seen at one time was ten pairs, on July 10; they were very noisy and acted as though defending young.

Farther south, about the Dominion Range Station, the willet apparently bred about the reservoirs, but usually there was only a single pair on each little pond, and the species would be absent from large areas.

Specimens, National Museum of Canada:

Cassils: 1 downy young; June 24, 1945; Rand and Clemens.

Dominion Range Station: 1 ♂ ad.; July 23, 1945; Rand and Clemens.

Long-billed Dowitcher. *Limnodromus griseus scolopaceus* (Say)

A migrant; Taverner in 1920 saw a flock of twenty-five birds of this species on Lake Pakowki on August 5 and took three adults.

These three specimens are females, bill 75, 75, 76 mm.; two retain most of their summer dress, and one is largely in winter plumage, but with some summer plumage that shows the characters of this form.

Wilson Snipe. *Capella gallinago delicata* (Ord)

Apparently an uncommon summer resident about the marshes of the prairies. Taverner in 1920 saw two near Strathmore, July 31, and two at Pakowki Lake, August 5, 1920; Rand and Clemens saw only a single bird, July 7, at Elkwater Lake.

Sanderling. *Crocethia alba* (Pallas)

A migrant; Taverner saw one at Strathmore on July 31, 1920.

Least Sandpiper. *Erolia minutilla* (Vieillot)

A migrant; Taverner noted a few at Strathmore on July 31, 1920.

Baird Sandpiper. *Erolia bairdii* (Coues)

A migrant; Taverner saw a dozen near Strathmore, July 31, 1920, and collected one; and Anderson collected one at Many Island Lake, September 18, 1918.

Pectoral Sandpiper. *Erolia melanotos* (Vieillot)

A migrant; Taverner in 1920 collected one near Strathmore, July 31; and Young in 1922 saw one in Waterton Lakes Park on September 1.

Semipalmated Sandpiper. *Ereunetes pusillus* (Linnaeus)

A migrant; Young recorded one just outside Waterton Lakes Park on August 5, 1922.

American Avocet. *Recurvirostra americana* Gmelin

A common summer resident locally; breeding; on most of the sloughs and reservoirs of the open prairie.

Taverner in 1920 found the species fairly common, recording it at Strathmore, Pakowki, and Many Island Lake, with thirty birds the most seen any one day. In 1945 Rand and Clemens found the species common in the Brooks area and downy young were seen July 22-27; next seen on the little reservoirs near the Dominion Range Station, where one or two birds were seen in several places July 14-24.

Specimens, National Museum of Canada:

Strathmore: 1 ♂, 1 ♀ ad.; July 31, 1920; Taverner.
Cassils: 1 ♂ ad.; June 24, 1945; Rand.

Wilson Phalarope. *Steganopus tricolor* Vieillot

Summer resident locally, apparently breeding; common; on almost all the sloughs and reservoirs of the open prairie.

Though Taverner found this species only at Caruso on July 30, and at Pakowki Lake on August 5, in 1920, Rand and Clemens found it common in the Brooks area, June 22-26, singly or in pairs, flying about scolding. A few were seen about the little sloughs just north of the Cypress Hills; and on the small reservoirs in the neighbourhood of the Dominion Range Station, July 14-23. On July 19 and 20 the first flocks of the season were seen, about a dozen birds.

In the Waterton Lakes Park, September 4, 1922, Young saw one.

There is only a single specimen in the National Museum from this area, from Cassils, June 28, 1945, taken by Rand and Clemens.

Northern Phalarope. *Lobipes lobatus* (Linnaeus)

Migrant; one specimen in the National Museum taken at Tyrrell Lake (near Milk River), July 21, 1923, by M. Y. Williams.

FAMILY—LARIDAE. GULLS AND TERNS

Ring-billed Gull. *Larus delawarensis* Ord

A common breeding gull on some of the sloughs in the Brooks area and recorded occasionally at other points in the extreme southern part of the province.

Rand and Clemens visited a colony with T. Randall near Tilley on June 22, where they saw about sixty-five nests of this species. In the Brooks area a few of these gulls were commonly seen along the roads over the prairie. On at least one occasion they were eating ground squirrels (*Citellus richardsonii*) that had been killed by motor traffic, and it is probable that these birds have learned to look upon roads as a habitat where dead ground squirrels are likely to be available.

Later, a few individuals were seen about the reservoirs in the vicinity of the Dominion Range Station, July 23, 1945, and Taverner, in 1920, recorded gulls, probably of this species, at Strathmore (one seen July 31), and at Pakowki Lake, August 6 (six seen, two collected).

In Waterton Lakes Park, in 1922, Young recorded gulls, probably of this species, a few in May, and fairly common in August and September. In 1945, from July 28 to August 10 Rand and Clemens saw a number of gulls daily about Waterton Lakes, up to twenty or thirty being seen in a day, all adults. The only one positively identified, collected on July 31, proved to be of this species.

California Gull. *Larus californicus* Lawrence

A common breeding bird on larger bodies of water on the open prairie in the Brooks area, according to Randall. Rand and Clemens did not visit any of these colonies, and saw only a few birds of this species, June 22-25, 1945, on sloughs they visited near Brooks; one sub-adult with pale olive-grey legs was collected.

Franklin Gull. *Larus pipixcan* Wagler

Locally breeds in colonies of thousands on the prairie, where there are suitable, tule-grown sloughs.

In 1945, there was a colony of probably several thousand birds nesting in a slough near Cassils, June 22-27. None was seen elsewhere; but Taverner, in 1920, recorded the species at Strathmore, July 31; Pakowki, August 5; and Many Island Lake, August 8.

Specimens in the National Museum:

Pakowki Lake: imm.; August 5, 1920; Taverner.

American Black Tern. *Chlidonias nigra surinamensis* (Gmelin)

A common summering bird in the Brooks-Cypress Hills area around marshy sloughs on the prairie, but not seen about the small reservoirs in the extreme southeastern part of the province, and apparently not common in the southwest.

Taverner in 1920 recorded the species at Strathmore, July 31 (one seen) and at Many Island Lake, August 8 (twenty-five seen). In 1945, Rand and Clemens found the black tern one of the common conspicuous birds about the marshy sloughs of the Brooks area, June 22-27, apparently nesting. Approaching a marsh, one was almost sure to have several of

these birds circling just overhead, scolding, and it was a common sight to see six to ten of these birds feeding along a stretch of shore or reeds. Black terns were also fairly common, July 5-11, about the marshy parts of the little lakes just north of the Cypress Hills.

In Waterton Lakes Park, Young recorded none, but Rand and Clemens saw two individuals, one on July 31 over a beaver pond, and one on August 1 flying over the prairie.

Linnaean Common Tern. *Sterna hirundo hirundo* Linnaeus

A breeding species locally in southern Alberta, apparently in small numbers.

Taverner saw birds at Strathmore, July 31 (one seen), and at Pakowki, August 3 and 4, 1920 (three seen); and Rand and Clemens visited a small colony of about ten nests on a small flat islet, rather bare of grass, in a slough near Tilley, in the Brooks area, June 22, 1945.

FAMILY—COLUMBIDAE. PIGEONS AND DOVES

Western Mourning Dove. *Zenaidura macroura marginella* (Woodhouse)

Scarce to common summer resident wherever there are trees on or bordering the prairie, and sometimes seen a mile or more from any trees; but apparently scarcer in the extreme southwestern part of the province.

Taverner, in his traverse of the prairies in 1920, saw only three, near Many Island Lake, August 7. In 1945, however, Rand and Clemens found them fairly common. In the extensive plantings of trees about Brooks, several could be seen or heard daily, June 22-28; on a drive from Medicine Hat to Irvine and the Cypress Hills, June 29, five or six were seen, over the open prairie within sight of a plantation of trees. In the forested area of the Cypress Hills, mourning doves were fairly common in the fringing aspen forest, but occurred throughout. Birds collected in the centre of the Cypress Hills had their crops filled with wheat, evidently having fed a mile or more away.

South of the Cypress Hills, to Milk River only occasional birds were seen, near the infrequent trees on the open prairie. In the poplar groves and dry brush along Milk River, between Comrey and Wild Horse, mourning doves were very common, July 19-24.

In Waterton Lakes Park area the species was scarce, our only record being two seen, May 27, 1922, just outside the park, by Young.

Specimens in the National Museum representing this area are:

Medicine Hat: 1 ♂, 1 ♀ ad.; May 1, 19, 1894; Spreadborough.

Cypress Hills and Milk River: 3 imm.; July 4-21, 1945; Rand and Clemens.

Though size is a poor criterion for the subspecies in Canada, colour is more reliable, and these birds compare well with other pale western birds.

FAMILY—CUCULIDAE. CUCKOOS, ETC.

Black-billed Cuckoo. *Coccyzus erythrophthalmus* (Wilson)

Evidently a rare bird in southern Alberta, where our only record is a specimen collected at Medicine Hat, May 21, 1894, by W. Spreadborough.

FAMILY—STRIGIDAE. TYPICAL OWLS

Arctic Horned Owl. *Bubo virginianus wapacuthu* (Gmelin)

Probably breeds, present only about the heavier timber along the larger rivers; in the forest of the Cypress Hills, and in the forest of the Rocky Mountains; in winter probably occurs throughout wherever there are clumps of trees.

Rand and Clemens found at least two broods of young, strong awing, hooting in the evenings, in the Cypress Hills, July 5-11, 1945, and J. D. Champion told them horned owls were common there, and that they ate many grouse and rabbits.

None was seen in the extreme southwest part of the province, but H. Hargrave said that two had spent the previous winter (1944-45) in the planted grove about the Dominion Range Station.

In Waterton Lakes Park, Young found a nest 30 feet up in a tree on May 29, 1922. The nest contained one young and one addled egg. Around the nest were the remains of two rabbits (*Lepus americanus*), three flying squirrels (*Glaucomys sabrinus*), and three deer mice (*Peromyscus*). In 1945, Rand and Clemens found the horned owl fairly common there, hearing them hooting in various localities in the park, almost nightly, July 30 to August 11. On August 6, Rand saw one in mid-afternoon that appeared to be hunting ground squirrels (*Citellus columbianus*) on foot. For some moments the bird was watched walking about on the ground in the edge of an isolated aspen grove where ground squirrels' burrows were very plentiful. The owl finally came to the edge of the grove and took wing. An examination of the area showed no signs of its having caught any prey.

Specimens are available from Waterton Lakes Park. An adult female taken January 4, 1924, by H. Knight, and another February 1, 1923, by G. W. Bevan, and two fledglings taken August 4, 1945, and May 29, 1922. One adult is a predominantly white and black bird, lightly tinged tawny, and compares favourably with a series of Red Deer River birds in similar plumage; it measures, wing, 388 mm.; bill from cere, 30 mm. The other is darker, and more tawny, and is an approach to *lagophonus*; it measures, wing, 372 mm.; bill, 30.3 mm. Both adults are winter birds and may not represent the breeding populations. On the basis of a large series from Red Deer River and from Cypress Hills, Saskatchewan, it is probable that most of southern Alberta is inhabited by a pale race of owl.

The pale horned owls of the prairies and the central arctic in Canada show little tendency to average lighter to the north, and some very pale birds come from the southern part of the area, so that a division into *B. v. wapacuthu* for the northern birds and *B. v. occidentalis* for the southern prairie birds seems impossible.

Breeding birds from the east slope of the Rocky Mountains may prove to be *B. v. lagophonus*.

Western Burrowing Owl. *Speotyto cunicularia hypugaea* (Bonaparte)

The burrowing owl, though apparently fairly common and widespread in Saskatchewan, seems to be scarce in southern Alberta.

Spreadborough took specimens at Medicine Hat in 1894 (Macoun and Macoun, 1909, Cat. Can. Birds, p. 318), which are no longer extant. Taverner did not record the species in 1920. Rand and Clemens, in their

extensive motoring over the southern part of the province, saw the species only twice; one seen and collected July 14, 1945, on the open prairie of the Dominion Range Station, and one seen at the entrance to its burrow about 8 miles west of Hilda on September 21.

Western Long-eared Owl. *Asio otus tuftsi*, Godfrey (Lesson)

We have only one record, an adult male specimen in the Museum, taken by W. Spreadborough, May 8, 1894, at Medicine Hat. Godfrey described this pale form, which appears fairly well marked, in 1947 (Can. Field-Nat., 61, p. 196).

Northern Short-eared Owl. *Asio flammeus flammeus* (Pontoppidan)

A scarce summer resident of the prairie marshes. We have only three records for the area: Taverner saw one near Manyberries Creek, August 5, 1920; Soper collected a specimen at Pendant d'Oreille, July 20, 1927; and Young saw one just outside Waterton Lakes Park, August 5, 1922.

FAMILY—CAPRIMULGIDAE. GOATSUCKERS

Nuttall Poor-will. *Phalaenoptilus nuttallii nuttallii* (Audubon)

A summer resident in the Cypress Hills; hitherto unrecorded for Alberta, though known as a fairly common summer resident in interior southern British Columbia, and there are records, unsupported by specimens, from Saskatchewan. (Potter, 1943, Can. Field-Nat. 57, p. 69, one heard for two or three nights in June, 1905, in Eastend area; Mitchell, 1924, Can. Field-Nat., 38, p. 111, reported seen by C. H. Young at south end of Last Mountain Lake in 1920.)

In 1945, Rand and Clemens found the species in the shrubbery and grassy openings in the forest on top of the west end of the Cypress Hills near the camping place known as Nicholls Springs. On June 29, just at dusk, one was heard calling from a shrubby glade. A search with a flashlight finally located it sitting on a gravelly stretch of trail in the open, and it was shot. Shortly afterwards another was heard to call from another small glade near Nicholls Springs but could not be found. Only heard once again, when one was heard in the early morning of July 1.

The specimen, a male, compared with British Columbia adults, is considerably paler above, the grey areas being purer grey; on the underparts the dark throat is much less evident, most of the dark feathers being subterminally barred and tipped with white, the abdomen and breast lack a buffy tinge and are less heavily barred.

Eastern Booming Nighthawk. *Chordeiles minor minor* (Forster)

Though we have no specimens of this subspecies (which nests farther north in Alberta), it undoubtedly occurs throughout our area in migration. The most southern localities where breeding occurs, as indicated by specimens in the National Museum, are Banff, Jasper, and Lac la Nonne, and we have migrants from as far south as Red Deer River.

Pacific Booming Nighthawk. *Chordeiles minor hesperis* Grinnell

A common summer resident over all the open prairie country, but apparently more common where there are badlands; scarce in the southwest in the Rocky Mountains.

Taverner recorded the species as fairly common on his traverse in 1920. In 1945, Rand and Clemens recorded several in the Brooks area, both over the open prairie and about the planted groves of trees, June 26-29. In the Cypress Hills area they were fairly common generally about the edge of the forest, July 1-12. In the area from the Dominion Range Station southward to Milk River, July 13-24, the species was common. Some evenings fifteen or more would be seen at one time about the planted groves at the Dominion Range Station, probably attracted by the concentration of insects about the irrigated area; and in the arid badlands of Lost River there were many calling and feeding at dusk. The branches of the large poplars in the groves along Milk River were favourite sleeping places of nighthawks and, on walking through these groves, one would see nighthawks continually flying from their perches, circling about through the branches and settling again, three or four often being in the air at once.

In Waterton Lakes Park, Young, in 1922, recorded this species as singles noted on only three occasions, the last of July and the first of August. In 1945, Rand and Clemens saw the species only once, on August 1, when several were seen flying about and booming over the open country near Pass Creek.

The A.O.U. Check-list, 1931, pp. 175, 176, includes only *C. m. minor* and *C. m. hesperis* as occurring in Canada, whereas Taverner, 1934, Birds of Canada, p. 268, gives *hesperis* as restricted to southeastern British Columbia and *C. m. sennettii* as occurring from southern Alberta to southern Manitoba.

The National Museum has a fair series of birds from this area, and a survey of these was made. The series includes the following adult males: British Columbia: Trail, 3; Alberta: Red Deer River, 2; Milk River, 2; Saskatchewan: Eastend, 1; Indian Head, 1; Last Mountain Lake, 2; Chaplin, 1; Dalesboro, 1; Manitoba: Whitewater Lake, 1. The three Trail males are slightly darker (a tendency toward *C. m. minor* as already pointed out by Oberholser, 1914, Bull. 48, U.S. Nat. Mus., p. 48), whereas the other specimens form a fairly uniform series without any obvious geographical trend in variation. The Manitoba bird may be slightly paler below than any other specimen, but is approached in this by a Red Deer River specimen; on the upperparts it is no paler than is a Milk River bird. As Oberholser in his monograph (l.c.) has identified a series from Maple Creek, and two from Indian Head, as *hesperis*, it seems that all these birds from neighbouring localities should be so referred.

This gives a peculiar pattern of distribution for *hesperis* in this area, with a narrow projection of the breeding range between that of *sennettii* and *minor*. However, when it is considered that *sennettii* is the pale race, *minor* the dark one, with *hesperis* intermediate in depth of coloration, it seems that where *sennettii* intergrades with *minor* a *hesperis*-like bird would result.

A single, very pale, grey and tawny specimen from Sweet Grass Hills, Alberta, July 10, 1927, stands completely outside the present series listed above, and is puzzling in view of lack of comparative material.

FAMILY—TROCHILIDAE. HUMMINGBIRDS

Rufous Hummingbird. *Selasphorus rufus* (Gmelin)

Apparently not uncommon along the east side of the Rocky Mountains in the western part of our area.

Young, in 1922, reported them as seen from May 20 to August 10 in Waterton Lakes Park. They were usually seen singly, but up to four were seen at one time.

Specimens, National Museum of Canada:

Jasper Park: 4 ♂, 2 ♀; June 21-July 8.

Coleman: 1, June 14.

Waterton Lakes Park: 2 ♂, 1 ♀; June 1, 20.

Calliope Hummingbird. *Stellula calliope* (Gould)

Fairly common along the eastern side of the Rocky Mountains in the western part of our area.

Young, in 1922, noted the species in June, once early in July, and a single bird on August 7, and reported one nest with eggs.

Specimens, National Museum of Canada:

Banff: 2 ♂; June 22.

Canmore: 1 ♂; June.

Waterton Lakes Park: 2 ♂; May 31, June 1.

FAMILY—ALCEDINIDAE. KINGFISHERS

Western Belted Kingfisher. *Megaceryle alcyon caurina* (Grinnell)

Generally absent from the prairies, but may occur locally, as along the main rivers and the Cypress Hills; probably migrates throughout the area. Fairly common in the extreme western part of our area on the edge of the Rocky Mountains.

Taverner, in his 1920 traverse of the province, saw the species only at Ghost River on July 29. Rand and Clemens in 1945 saw none on their travels on the plains, though it may summer on Milk River, as it does on Red Deer River farther north (Taverner, 1919, *Auk*, 36, p. 248). In the Cypress Hills, Mr. J. D. Champion told us he had seen one on the headwaters of Battle Creek on July 1, 1945. That the kingfisher may occur throughout in migration is indicated by one seen along an irrigation ditch near Brooks on September 24, 1945, by Rand.

In Waterton Lakes Park, Young, in 1922, found the kingfisher not very plentiful, but a few were seen in August. In 1945, Rand and Clemens saw several, August 2-8, and were told by Mr. G. Bailey, in charge of the fish hatchery, that sometimes one comes to the outside ponds and eats the fingerling trout. The slats and chicken wire covering these ponds successfully combat this. The provincial fish hatchery near Macleod is troubled with the presence of kingfishers, and through the kindness of Mr. E. S. Heustis and Mr. H. B. Watkins, of the Provincial Government, specimens were received from there.

In the National Museum is an adult female from 7 miles west of Macleod, July 1945, and an immature female from Waterton Lakes Park, August 3. The measurements of these two females, wing, adult 169 mm.;

immature, 166 mm., shows them definitely to be the western form. This correlates with the eastern extension of a number of other western forms into extreme southwestern Alberta, such as that of *Carpodacus cassini*; *Dendrocopos villosus monticola*, and *Cyanocitta stelleri*.

In identifying these two kingfishers it was necessary to examine all the material in the National Museum, and although it fell rather clearly into the two currently accepted subspecies, a number of interesting points were brought out.

Grinnell, in characterizing the western subspecies, claimed it had proportionately longer secondaries (and hence a shorter wing tip) than the eastern form, and figured this (1910, Univ. Calif. Pub. Zool., 5, p. 388), and Swarth also used this character (1912, Univ. of Calif. Pub. Zool., 10, pp. 32, 33). Ridgway (1914, U.S. Nat. Mus. Bull. 50, pt. 6, p. 420) apparently transposed this, saying the western bird had a longer wing tip. Later, Oberholser (1918, Auk, 35, p. 463) pointed out that this character was unreliable. A survey of the material in the National Museum indicates that this character is of no value, as the following measurements show:

Length of wing tip of two subspecies of *Megaceryle alcyon*:

—	Adult males	Adult females
	Mm.	Mm.
<i>M. a. caurina</i> (British Columbia).....	31, 31, 32.5	33, 33, 33
<i>M. a. alcyon</i> (Nova Scotia to Alberta).....	28, 30, 30, 32, 34	28, 28, 28, 31, 31

In making these measurements it was found that most specimens could not be used, as the secondaries had been loosened from the ulna in skinning and were more or less bunched part way along the ulna. This artificially shortens the wing tip. Grinnell's figure (l.c.) suggested this had happened with his birds, and, at my request, Dr. A. H. Miller kindly examined the bird Grinnell figured and found this to be the case. However, the two subspecies are fairly clearly separated on size, as is shown in the following table:

Wing length (chord) of two subspecies of *Megaceryle alcyon*:

—	<i>M. a. alcyon</i>	<i>M. a. caurina</i>
	Mm.	Mm.
Male adult.....	(152 ¹), 156-160	160-164
Female adult.....	154-164	165-169
Male immature.....	145-161	161, 161
Female immature.....	148-162	165-171

¹ Once only.

There is an additional difference between the two populations, and that is in sexual dimorphism in size. The western race, *M. a. caurina* exhibits greater sexual dimorphism in size than does *M. a. alcyon*. This is

apparent not only in the material in the National Museum (*See above*), but also in the figures given (in mm.) by Grinnell and by Swarth, as is shown below.

Grinnell's (l.c.) figures, wing:

M. a. caurina ♂ ad. 160.5, 161.2; ♀ ad. 165.9; ♀ imm. 167.
M. a. alcyon ♂ 146.5, 155.8; ♀ 151.2, 152.5, 153.7.

Swarth's (l.c.) figures, wing:

M. a. caurina ♂ 157-162.5 (av. 159.3); ♀ 159-166 (av. 161.4).
M. a. alcyon ♂ 150-159 (av. 154.4); ♀ 152-162 (av. 155.4).

Though the difference between the two subspecies is one of size, it is interesting that the variation in size does not show a gradual change from east to west, but there is a sudden change in British Columbia and southern Alberta from the smaller to the larger form as is shown in the following table.

Wing length (chord) of the two subspecies of *Megaceryle alcyon*:

Megaceryle alcyon caurina (Grinnell)

—	♂ ad.	♀ ad.	♂ imm.	♀ imm.
	Mm.	Mm.	Mm.	Mm.
British Columbia ⁽¹⁾	160, 161 164, 164	165, 165, 167 169	161, 161	165, 165, 171
Southern Alberta.....	.....	169 ⁽⁹⁾	165 ⁽⁸⁾ , 166 ⁽¹⁰⁾

Megaceryle alcyon alcyon (Linnaeus)

—	♂ ad.	♀ ad.	♂ imm.	♀ imm.
	Mm.	Mm.	Mm.	Mm.
British Columbia.....	152 ⁽²⁾	153 ⁽⁴⁾ , 159 ⁽⁵⁾ , 160 ⁽⁶⁾
Yukon.....	158	160	161	162
Alberta, central and northern.....	156 ⁽¹¹⁾ , 157 ⁽¹²⁾	156 ⁽¹³⁾ , 160 ⁽¹¹⁾	155 ⁽¹²⁾	155 ⁽¹²⁾ , 158 ⁽⁷⁾
Manitoba.....	.....	.....	158, 158	154, 160
Ontario.....	158, 158, 160	154, 164 ⁽³⁾	145, 148, 153	148, 155
Quebec.....	.....	157, 158	.....	152
New Brunswick.....	.....	.....	161	.....
Nova Scotia.....	158	.....	.....	.....

(1) Comox, Departure Bay, and Barkley Sound on Vancouver Island, Brackendale, Sicamous, Agassiz, Tami Hy (Tommy High) Creek, Lillooet, Revelstoke, Vasseau Lake, Midway, and Elko.
 (2) Tami Hy Creek, September 9.
 (3) Lac Seul, July 2.
 (4) Barkley Sound, January 1.
 (5) Masset, Queen Charlotte Islands, September 12.
 (6) Liard River Valley, August 3.
 (7) Banff, August 13.
 (8) Morrin, September 19.
 (9) Macleod, 7 miles west, July.
 (10) Waterton Lakes Park, August 3.
 (11) Lac la Nonne.
 (12) Red Deer River.
 (13) Wood Buffalo Park.

The present survey indicates certain changes needed in the accepted ranges of the subspecies.

Megaceryle alcyon alcyon (Linnaeus)

The 1931 A.O.U. Check-list (p. 185) gives the range of this form as it affects Canada as summering west to Mackenzie and the base of the Rocky Mountains; wintering in British Columbia and irregularly in Ontario. Taverner (1934, Birds of Canada, p. 276) says the place of meeting of the two forms is uncertain. Cowan, in 1939 (Occ. Papers British Columbia Prov. Mus. No. 1, p. 35) reported this race from the Peace River area in British Columbia.

Yukon has been included in the range of the western race *M. a. caurina* (Grinnell), apparently on the basis of Ridgway's allocation of one Yukon specimen to that form (1914, Bull. U.S. Nat. Mus. 50, pt. 6, p. 420), but the additional Yukon material now available falls well within the range of *M. a. alcyon* (wing ♂ ad. 158, ♀ ad. 160; ♂ imm. 161, ♀ imm. 160) and it seems better included with that race.

In 1944 (Can. Field-Nat., vol. 58, p. 119) I recorded an immature female, wing 161, from Liard River as *M. a. caurina*, but in view of this being within the upper limit for *alcyon* and small for *caurina*, and the allocation of birds from the north and the south to *alcyon*, it seems advisable to place it now under *alcyon*.

This extends the summer range of *alcyon* to northeast British Columbia and Yukon.

Though the 1931 A.O.U. Check-list lists *alcyon* as wintering in British Columbia, Brooks and Swarth in 1925 did not include this race in their distributional summary of British Columbia birds (Pacific Coast Avifauna, No. 17, p. 63), nor did Brooks mention it in his supplement (1942, Condor, 44, pp. 33, 34). (Northeast British Columbia was not included in these works.)

However, two specimens from British Columbia, an adult male (wing 152, taken Tami Hy Creek, September 9), and an immature female (wing 153, taken Barkley Sound, January 1), seem referable to this form on the basis of their small size that falls so far outside the range of variation of *caurina* and within the lower part of the range of measurements of *alcyon*. The dates of capture are consistent with their being migrants or wintering birds.

The Queen Charlotte bird, wing 159, taken September 12, might well be a migrant example of *alcyon*, and with the supporting evidence of the other two specimens is perhaps best referred to *alcyon*.

The range in Canada now stands as: summers from eastern Canada (Nova Scotia) to central western Alberta, south to Banff and Red Deer River; northeast British Columbia (Peace and Liard Rivers) and Yukon territory (Teslin and Sheldon Lake and Lapie River); at least occasional in southwest British Columbia (Tami Hy Creek and Barkley Sound) in autumn and winter.

Megaceryle alcyon caurina (Grinnell)

The 1931 A.O.U. Check-list, p. 186, includes Yukon territory in the range of this subspecies, and does not include southern Alberta, which is east of the Rocky Mountains. I have shown above that northeast British Columbia and Yukon birds are referable to *M. a. alcyon*. Our material shows southern British Columbia birds are referable to this form, but does

not indicate the northern limits of its range there. Our additional material from Alberta indicates that extreme southwest Alberta birds (Waterton Lakes and Macleod) are also referable to this form, and a single autumn Red Deer River bird (Morrin, September 19, immature female, wing 165 mm.) indicates that in the autumn individuals of this subspecies may straggle that far north.

The range in Canada now stands as: summers in British Columbia, except the northeast; and in extreme southwest Alberta.

Eastern Belted Kingfisher. *Megaceryle alcyon alcyon* (Linnaeus)

Though we have no specimens of this species from south of Banff and the Red Deer River, where it summers, it is probable that in migration at least this subspecies occurs over all the southern part of the province, and it is possible that summering birds from the southeast part of the province should be referred here.

FAMILY—PICIDAE. WOODPECKERS

Flicker. *Colaptes cafer collaris* × *auratus luteus*

Common locally about natural aspen groves; present but uncommon about the poplars fringing the rivers of the plains; common about some planted groves of trees, absent from others.

In traversing southern Alberta in 1920, Taverner recorded only one flicker, near Elkwater Lake, August 6. In 1945, Rand and Clemens found flickers common in the plantations of trees about Brooks; very common about the forests of the Cypress Hills, and rather scarce in the poplar groves along Milk River. No flickers were seen about the planted trees of the Dominion Range Station. They evidently also occur along Saskatchewan River, as Spreadborough took specimens at Medicine Hat in 1894.

Full-grown young were out of the nest by June 28 (1945) at Brooks.

Specimens, National Museum of Canada:

Medicine Hat: 2 ♂, 1 ♀; April 18-27, 1894.

Cypress Hills: 4; June 30-July 11, 1945.

Milk River: 1; July 20, 1945.

Waterton Lakes Park: 1; July 4, 1923.

The three Medicine Hat birds have yellow remiges and rectrices, and in the field might be taken for *auratus*, but the two males have red moustache stripes and all have grey throats. They all have the red nuchal patch. Of the four Cypress Hills birds, two have yellow wings and tails, and red nuchal bar as *auratus*, but red moustaches and greyish throats; another specimen has orange wings and tail, fawn throat, black moustaches and a faint red nuchal bar; the fourth specimen has red wings and tail, black moustaches with a little red in them, conspicuous red nuchal bar, and a mixed grey and fawn throat. The Milk River specimen has red wings and tail like *cafer*, a grey and fawn throat, and a faint red nuchal bar. The Waterton Lakes Park specimen is very similar to British Columbia *cafer*.

From field notes, most Brooks specimens appeared to have the yellow flight and tail feathers of *auratus*, but one seemed to have these parts pale orange. In the Cypress Hills area yellow-shafted birds were seen, but most seemed to have some orange in wings, and the impression was one of a hybrid population. The birds seen along Milk River all had red shafts like *cafer*, and the same was true of Waterton Lakes Park.

In field identification it is often impossible to discern marks of hybridization. A yellow-shafted bird may have the throat and moustaches of *cafer*, and a red-shafted bird may have the throat and moustaches of *auratus*. In view of the specimens collected it seems advisable to refer the population to a hybrid status, as indicated in the heading. It may be that the Waterton Lakes population may be predominantly *C. cafer*, though Coues (1878, Bull. U.S. Geol. and Geog. Surv. Terr., 4, p. 618), reports hybrids and *auratus*-like birds from this area. Taverner (1919, Auk, 36, p. 250) has shown that the flickers of Red Deer River also belong to this hybrid population, but farther north on Battle River they can be referred to *C. auratus*.

As *C. c. collaris* is the subspecies affecting the western Alberta population of hybrid flickers, it is in order here to take up the western limits of its range.

Brooks and Swarth (1925, Pacific Coast Avifauna, No. 17, p. 70) give the range of *C. c. cafer* in British Columbia as east to Okanagan Valley, with *C. c. collaris* restricted to eastern British Columbia north to Yellowhead Pass.

The material in the National Museum indicates a modification of these ranges. The two subspecies differ chiefly in colour, *collaris* being paler, less brownish above, and with less of a vinaceous wash below. These differences are most apparent in the fresh, unworn plumage; worn summer birds are less distinct.

We have the following specimens that are referable to *C. c. cafer*:

In fresh plumage:

Vancouver Island, 8 (September–December); Queen Charlotte Islands, 2 (September 5); Tami Hi (Tommy High) Creek, 2 (September); Huntington, 1 (September); Vancouver, 1 (November).

In immature plumage:

Vancouver Island, 7; Queen Charlotte Islands, 1.

In worn plumage:

Vancouver Island, 4 (April–July); Agassiz, 2 (May); Brackendale, 1 (June); Chilliwack, 1 (May).

We have the following specimens referable to *C. c. collaris*:

In fresh plumage:

California: Santa Clara co., 1 (January).
British Columbia: Okanagan Valley, 4 (February–March); Phoenix, 1 (September); Trail, 1 (June 10; a small area of new plumage on back).
Alberta: Jasper, 2 (September).

In immature plumage:

California: Santa Clara co., 1 (June).
Alberta: Jasper, 1 (July); Waterton Lakes, 1 (July).

In worn plumage:

British Columbia: Fernie, 1 (May); Trail, 1 (June); Midway, 1 (April); Okanagan Valley, 3 (April–May); Revelstoke, 2 (April–May).
Arizona: Grand Canyon, 1 (June).
Alberta: Jasper, 3 (June–July); Banff, 1 (June).

Juveniles (of doubtful allocation):

Sicamous, 1; Lillooet, 3; Kamloops, 1.

The Vancouver Island birds can be considered topotypical *C. c. cafer*. The fresh-plumaged birds are all very dark brown above with a very strong vinaceous wash below. Of the fresh-plumaged mainland and Queen

Charlotte Islands birds referred here, all but one agree well with the Vancouver Island birds. One of the two Tami Hi Creek birds is somewhat paler on the back but is as deeply coloured below.

Specimens of *C. c. collaris* in fresh plumage, from within the accepted range of this subspecies, are from California (1), and from eastern British Columbia from Phoenix (1) and Trail (1), and in Alberta from Jasper (2). As would be expected from their widely separated points of origin, there is more variation than in the series of *cafer* mentioned above. However, compared with the Vancouver Island series, they all differ strikingly both above and below as described.

Our four Okanagan Valley birds in fresh plumage compare fairly well, above and below, with the above series of *collaris* rather than with Vancouver Island birds.

Birds in worn plumage are much paler above and less vinaceous below than in fresh plumage. Comparing the specimens in worn plumage, those listed under *collaris* differ fairly clearly on the average from those listed under *cafer* in the paler and less brownish upperparts, though the difference in the underparts is slight. Two of the Okanagan birds are the palest in the *collaris* series.

In the immature plumage, the vinaceous colour of the underparts has not appeared. On the upperparts the Vancouver Island and Queen Charlotte Island birds are much darker than all the mainland birds. However, a Sicamous juvenile (a stray?) that is from the range of *cafer*, as well as three Lillooet juveniles, and one from Kamloops are indistinguishable from immatures from Santa Clara county, California, Jasper, Alberta, and Waterton Lakes, Alberta.

The evidence suggests that the change from the light- to the dark-plumaged populations may occur at a different place in the immatures than in the adults, but the evidence is not conclusive. I prefer to base identifications on adults only and not to identify subspecifically the Kamloops, Lillooet, and Sicamous juveniles.

The range of *C. c. collaris* thus extends west to Okanagan Valley at least, and north to Yellowhead Pass; the range of *C. c. cafer* is coastal British Columbia and the islands, with the meeting grounds with *collaris* to be established.¹

Western Red-headed Woodpecker. *Melanerpes erythrocephalus caurinus* Brodkorb

Recorded at Medicine Hat where Spreadborough took one on May 24, 1894; and in Waterton Lakes Park, where Young saw one on June 2, and three on July 17, 1922.

The Medicine Hat specimen, an adult male, has a wing of 149 mm. We have only one other specimen of this race, an adult male from Cypress Hills, Saskatchewan, wing 147 mm.

The larger size of these birds is evident when compared with a series of adults from southeast Ontario, that have the following measurements (10) 131-142 (av. 135.9 mm.).

Lewis Woodpecker. *Asyndesmus lewis* (Gray)

Young recorded the species in Waterton Lakes Park as follows: July 3, one; July 24, one; August 5, two; September 5, nine. There are a number

¹ Munro and Cowan, 1947, British Columbia Prov. Mus., Spec. Pub. No. 2, pp. 138, 139, have also restricted *C. c. cafer* to the coastal area.

of other records for central Alberta, including a sight-record for Big Stony Point on the north shore of Lesser Slave Lake, May 28, 1928, by T. E. Randall, who also collected a specimen at Castor, Alberta, in 1924, a specimen that Prof. Wm. Rowan secured for his collection (letters, T. E. Randall to P. A. Taverner, December 26, 1930, and Wm. Rowan to P. A. Taverner, June 22, 1924).

Yellow-bellied Sapsucker. *Sphyrapicus varius varius* (Linnaeus)

The only record we have for our area is an adult male taken May 18, 1894, at Medicine Hat by Spreadborough. It is possibly a migrant. This is the subspecies of northern Alberta, south at least to Red Deer River, from which we have a nesting female specimen, taken near Red Deer, June 30, which is also characteristic of this race, though with a black cap. Occasional specimens from northern Alberta may show a slight amount of red in the nape, as shown by an Edmonton bird (♂ ad. May 6) and a Wood Buffalo Park specimen (♂ ad. June 23). Otherwise these specimens agree with *varius*, as do the rest of the series from northern Alberta.

Red-naped Yellow-bellied Sapsucker. *Sphyrapicus varius nuchalis* Baird

The status of this bird on the east slope of the Rocky Mountains is obscure. We have no record for our area, where it is to be expected as we have an adult male specimen from Banff, June 2, 1891, that is typical of this race in red on nape, extended red patch on throat, reduced yellow on breast, and reduced white on back. However, this specimen was the only record Clarke and Cowan (1945, *Can. Field-Nat.*, 59, p. 94) had for Banff, and it is possible the bird is only casual in southwest Alberta.

[Williamson Sapsucker. *Sphyrapicus thyroideus* subsp.

This species is known definitely only from southern British Columbia. Young recorded one in Waterton Lakes Park in 1922 as follows: "one was seen May 17, a female light brown barred. It was high up on the top of a dead spruce tree." Though the observations seem definitely referable to the species, it would seem advisable to keep it on the hypothetical list until an Alberta specimen is secured.]

Northern Hairy Woodpecker. *Dendrocopos villosus septentrionalis* (Nuttall)

Fairly common locally in the eastern part of our area. In the aspen forests of the Cypress Hills, Rand and Clemens found this species fairly common, and less so in the coniferous forest, June 30 to July 11, 1945. One was collected along Milk River, July 21.

Our material does not show a noticeable increase in size, from south to north in Alberta, as occurs in the species generally.

Alberta adult specimens, wing measurements:

	♂	♀
	Mm.	Mm.
Wood Buffalo Park.....	136	128, 132
Edmonton and Lac la Nonne.....	126, 129	127, 127
Jasper.....		130
Buffalo Lake.....	133	
Red Deer River.....	128, 132	129
Medicine Hat.....		130
Cypress Hills.....	138	
Milk River.....	128	

Rocky Mountain Hairy Woodpecker. *Dendrocopos villosus monticola* (Anthony)

Uncommon in the forests of the eastern side of the Rocky Mountains in southwest Alberta, north at least to Canmore.

Young, in Waterton Lakes Park in 1922, shot a female, ready to lay, on May 22, and saw a few there in August and September; in 1923 he collected one on May 12, and another on August 30. In 1945, Rand and Clemens saw two there, July 27 and 28.

We have one additional specimen from Alberta, taken at Canmore, May 29, 1891, by Spreadborough.

These four specimens compare well with south British Columbia specimens in the reduction of white in the upper wing coverts, and show no approach to *septentrionalis*. Thus the accepted range of this subspecies must be extended to include southwestern Alberta.

Northern Downy Woodpecker. *Dendrocopos pubescens medianus* (Swainson)

Found, in 1945, only in the Cypress Hills where a single bird, an adult male, was seen and collected on July 5. It may also occur along the wooded streams that flow through the plains, as we have a specimen taken by Spreadborough on April 12, 1894, at Medicine Hat. It is an adult male.

The wing measurements of these two birds are large (99, 102 mm.). There is the possibility of two races being involved, *medianus* of eastern Canada and *nelsoni* of Alaska and northwest Canada, which is said to be larger, with less black in the tail, and with white areas purer white.

A survey of the material in the National Museum gives the following wing measurements of summer (April–September) adults.

Area	♂ ad.	♀ ad.
	Mm.	Mm.
Nova Scotia.....	94	94, 96
New Brunswick.....	97, 100	97
Quebec (south).....	95, 95	96, 98
Ontario:		
Point Pelee.....		97
Rideau River.....	95, 96	95
Ottawa.....	93, 94, 95, 95	94, 95, 95, 97, 98, 98, 99
Kapuskasung.....	97	96
Manitoba:		
Whitewater Lake.....	94	100
Oak Lake.....		97
Shoal Lake.....	94, 94, 95, 96, 99	97, 97
Dauphin.....	97	100
Steepprock.....		100
The Pas.....	96, 99	
Alberta:		
Cypress Hills.....	102	
Medicine Hat.....	99	
Red Deer River.....		97
Banff.....	99	
Edmonton.....		97
Lac la Nonne.....	95, 96	98, 99
Wood Buffalo Park.....		101

Ridgway (1914, Bull. 50, U.S. Nat. Mus., pt. 6) characterized the wing length (in mm.) of *medianus* as:

♂ ad. 91-96.5 (av. 94.1); ♀ ad. 91.5-97 (av. 94.7);

and *nelsoni* as:

♂ ad. 95-101.5 (av. 99.1); ♀ ad. 97-101.5 (av. 98.8).

In size the two subspecies are very close, and on wing length alone it would seem impossible to separate the present series into two subspecies. Though specimens from Nova Scotia and southern Ontario average slightly smaller, specimens from New Brunswick differ little from those in central and northern Alberta. Ridgway's measurements (l.c.) show that in eastern North America there is a progressive increase in size with increase in latitude. This is faintly evident in the eastern Canadian material, and a further slight increase in size is seen with a westward trend, comparing Alberta with Manitoba and Ontario birds. This trend also occurs in the flicker (*C. auratus*) and hairy woodpecker (*D. villosus*).

The postulated purer white of the white parts I am loath to use, due to the dirtiness of many specimens. Apparently the underparts of this species quickly become stained, and the locality from which the specimens were taken, as well as the length of time since their last moult, affects this. However, the Wood Buffalo Park specimen is strikingly white, compared with most other material.

The lesser barring of the tail in northwestern birds, as set forth by Ridgway, I have tabulated for our material. The barring on the outer rectrix for each specimen has been given a grade from 1 to 5; grade 1 has one-half a bar or less; grade 2 has about one bar, and so on up to grade 5, which has two and one-half bars on the outer rectrix.

The data follow:

—	1 ($\frac{1}{2}$ bar or less)	2 (1 bar)	3 ($1\frac{1}{2}$ bars)	4 (about 2 bars)	5 (with $2\frac{1}{2}$ bars)
Nova Scotia.....			4		
New Brunswick.....			2	2	
Quebec (south).....			3		3
Ontario:					
Rideau River, London, Point Pelee.....			4	1	3
Ottawa, and Georgian Bay.....		4	9	3	
Kapusking.....			1	1	1
Lac Seul.....				1	
Manitoba:					
Whitewater to Shoal Lake.....		2	4	5	3
Riding Mt. to The Pas.....	1		5	4	
Alberta:					
Cypress Hills.....	1				
Medicine Hat.....			1		
Red Deer River.....		1			
Banff.....			1		
Edmonton.....		1			
Lac la Nonne.....	1	2	1	2	
Wood Buffalo Park.....			1		

An examination of this table shows plainly that there is a decrease in the amount of barring in the tail from east to west, but it is only average, and there is considerable overlap.

Although recognizing the slight tendency toward an increase in size and a decrease in barring in the tail as one goes westward, it seems possible to identify positively only a small part of any population by its morphological characters, and hence it seems inadvisable to separate any of them, and preferable to refer them all to *medianus*, the range of which in Alberta thus extends from Wood Buffalo Park south to Banff Park in the west, and to Cypress Hills in the east.

Batchelder Downy Woodpecker. *Dendrocopos pubescens leucurus* (Hartlaub)

Found only in the extreme southwest part of the province. Though Young, in Waterton Lakes Park, in 1922 saw only a single bird, on May 22, Rand and Clemens, in 1945, found the species common in the poplar and aspen forests at low altitudes, July 28 to August 4, and on July 28 saw two or three groups of fully fledged young.

The National Museum has three Waterton Lakes specimens, 1 ♂ ad., May 22, 1922 (wing 102 mm.) and 1 ♂ imm. and 1 ♀ imm., July 28, 1945. Compared with *medianus* (including Banff, Red Deer, and Cypress Hills birds) the adult male has much less white spotting in the upper wing coverts and in this compares well with southern British Columbia birds. The two immatures also have the white spotting of the upper wing coverts reduced (in the female there is only one exposed white spot), and in this are also referable to *leucurus*. But in juvenile woodpeckers this character is not as constant as it is in the adults, and juveniles from the range of *medianus* may also show a reduction of white in the upper wing coverts.

The above specimens extend the known range of this subspecies from British Columbia into the Waterton Lakes Park area of southwest Alberta.

Alaska Ladder-backed Woodpecker. *Picoides tridactylus fasciatus* Baird

Evidently common locally in Waterton Lakes Park where Rand and Clemens found it in only one locality. This was in the upper Pass Creek Valley, in a stand of large coniferous trees among which were many dead stubs. In a morning spent investigating this area, six or more woodpeckers were heard in different places. They were giving a short loud pounding or slow tattoo on hard dead wood and the sound was very loud and carried far through the forest. This was on August 11, 1945. Two of these drumming birds were seen and proved to be this species. One specimen was collected. It is an immature male, with the white in the back forming a more or less continuous white dorsal streak.

The fourteen Alberta specimens in the National Museum average less white in the back than do eleven Alaska specimens (Chitina River area); the barring being more distinct, with less tendency toward formation of a dorsal stripe. Surprisingly, thirteen south British Columbia specimens average slightly less white in the back than do Alberta specimens.

Though the above specimens, in series, separate rather clearly from a series of eastern birds (Manitoba eastward), there is a certain amount of overlap due to individual variation. This does not occur in the Alberta, northeast British Columbia, nor Alaska specimens; but in the south British Columbia birds two of the least heavily marked birds (males from

Rossland, July 26, wing 106, 115 mm.) are not to be distinguished with certainty from the two most heavily marked of ten Manitoba birds, (♂, wing 115, 116 mm.) and are closely approached by a Bonne Esperance, Quebec, specimen (♂, wing 113 mm.)

It is, perhaps, overlap of this kind, by individual variation, that has caused the subspecies *bacatus* to be recorded as casual in winter in southern British Columbia.

Within Alberta there does not seem to be any geographical variation in colour: a Waterton Lakes and a Mount Forget-me-not male fall within the variation exhibited by five Wood Buffalo Park males. The Waterton Lakes male is more striped, rather than barred, on the dorsum compared with most north Alberta birds, but so is one Wood Buffalo Park bird.

Their measurements are:

Area	Male	Female
	Mm.	Mm.
Wood Buffalo Park.....	113, 114, 117, 118, 118	108, 113
Battle Creek.....		114
Jasper.....	118, 120	
Mount Forget-me-not.....	117	
Banff.....		111, 114
Waterton Lakes.....	117	

FAMILY—TYRANNIDAE. TYRANT FLYCATCHER

Eastern Kingbird. *Tyrannus tyrannus* (Linnaeus)

Though the kingbird depends on trees for its nesting site, it is one of the widespread species over the prairies in summer. Though absent where there are no trees whatever, if there is a clump of wolf-willows, an isolated tree, or large shrub in a draw out on the open prairie it may harbour a pair of this species. In the shrubbery and poplar groves along Milk River, kingbirds were also common. The species has profited extensively by settlement and irrigation, and the attendant tree growth. It was common generally in the tree plantations about Brooks. Kingbirds had even settled in the trees that had been planted about the Dominion Range Station, though few other species had colonized them. Though present about the edges of forested areas of the Cypress Hills, and the eastern edge of Waterton Lakes Park, the species was not common in the Cypress Hills themselves, nor in Waterton Lakes Park beyond the forest edge.

The kingbird seemed more common in shrubbery out on the prairie than near the forest edge. One morning about six pairs were located in a half-mile or so along Lost River, where they were nesting in the wolf-willow that grew 4 to 6 feet high. One nest in such a wolf-willow clump contained two newly hatched young and one egg, on July 16.

The latest date on which the species was recorded in Waterton Lakes Park by Young in 1922 was on August 5, when ten were seen, the largest number recorded on any day during his stay there. In 1945, Rand and Clemens recorded the species there until August 9.

Specimens, National Museum of Canada:

Medicine Hat: 2 ♀; May 19, 22, 1894; Spreadborough.

Dominion Range Station: 2 ♂, 2 ♀; July 16, 17, 1945; Rand and Clemens.

Milk River, long. 112° 25': 1 ♂; June 25, 1927; Soper.

Waterton Lakes Park: 1 ♀; June 18, 1923; Young.

Wing, ♂, 112, 114, 118; ♀, 111, 114, 114, 118.

Miller (1941, *Condor*, 43, pp. 260, 261) has reviewed the differences between eastern and western populations of kingbirds, and found that though western birds average paler above and on the chest, and with a greater amount of white on the tail, there is too great an overlap to recognize the proposed subspecies *Tyrannus tyrannus hespericola*. His remarks apply equally well to these specimens as compared with specimens from eastern Canada (Ontario eastward).

Arkansas Kingbird. *Tyrannus verticalis* Say

Common locally along Milk River, and probably Saskatchewan River; rare in Waterton Lakes Park.

Taverner in 1920 did not record this species in his traverse of the province. Rand and Clemens, in 1945, found the species only locally along Milk River, south of the Dominion Range Station, July 19-21. In Waterton Lakes Park, Young reported one on June 1, 1922. None was seen about irrigation projects, settlements, or the forests of the Cypress Hills.

Along Milk River the Arkansas kingbirds were found in the groves of old, large, poplar trees, where they perched on the tops of the trees and were very noisy. In some groves there were three or four birds in sight at one time; other groves along the river seemed to harbour none of this species.

These observations do not accord with Taverner's (1934, *Birds of Canada*, pp. 289, 290) account of their habitat selection, in which he stresses the importance of imported planted trees and the predilection of the species for the vicinity of human habitation.

Specimens, National Museum of Canada:

Medicine Hat: 6 ♂, 1 ♀; May 14-25, 1894; Spreadborough.

Milk River: 2 ♂; July 19, 21; Rand and Clemens.

Sweet Grass Hills: 2 ♂, 1 ♀; July 8, 10, 1927; Soper.

Say Phoebe. *Sayornis saya* subsp.

Fairly common locally in the southwest part of the province, in the badlands country.

In 1945, Rand and Clemens found this species only in the badlands type of country between the Dominion Range Station and Milk River, July 14-24. Where erosion had given cutbanks, out on the open prairie, or along the valley sides of Milk River, pairs of these birds occurred at widely separated intervals. They were usually seen in pairs, were rather shy, and were probably nesting.

The different habitats frequented by this species in Canada are very diversified, varying as they do from the badlands of the arid prairies to the vicinity of cabins by subalpine lakes in the Yukon mountains and the Precambrian country about Great Bear Lake.

Specimens, National Museum of Canada:

Medicine Hat: 2 ♂; April 27, 28, 1894; Spreadborough.

Milk River, long. 112° 25': 1 ♂; June 28, 1927; Soper.

Sweet Grass Hills: 1 ♀; July 8, 1927; Soper.

In 1900 (*Auk*, 18, p. 115) Bishop described the birds from the northwest as *S. s. yukonensis* characterized by its darker coloration, with grey of the upperparts clearer; with pale edgings of the wing coverts and secondaries narrower; the tail, longer; and the bill shorter and relatively broader.

Measurements of material in the National Museum are as follows:

Adult male	Wing	Tail	Tarsus	Exposed culmen
	Mm.	Mm.	Mm.	Mm.
Alaska:				
Chitina River.....	106	81	20	12.5
Yukon:				
Lapie River.....	102	80	20	13
British Columbia:				
Near Fort St. John.....	99	79	18.5	13.5
Osoyoos Lake.....	99	76	19	13
Alberta:				
Jasper.....	105	80	20	12.5
Lac la Nonne.....	106	83	21	13
Red Deer River.....	106	.....	21	14
	101	82	22	14
Medicine Hat.....	108	85	21.5	12
	110	83	19.5	13
Milk River area.....	106	82	21	13
Adult female				
Yukon:				
Lapie River.....	96	76	19	13.5
	95	76	19	12
British Columbia:				
Penticton.....	98	78	20	12.5
Alberta:				
Edmonton.....	101	78	20	14
	101	80	18	12
Jasper.....	101	81	19	12
Red Deer River.....	100	77	20	13
Sweet Grass Hills.....	102	79	20	13.5
Saskatchewan:				
Cypress Lake.....	96	77	20	13
Manitoba:				
Griswold.....	101	79	20	14

These measurements do not show any differences between birds from northern Canada and Alaska when compared with those from southern Canada.

There are also specimens in immature plumage from Chitina River, Alaska; Sheldon Lake, Yukon; Great Bear Lake, N.W.T.; Liard River, B.C.; Lac la Nonne and Red Deer River, Alberta.

In general colour of upperparts the specimens from Lac la Nonne and Jasper northward are appreciably darker and a clearer grey, less sandy. However, there are several factors that may affect this: the varying age of skins since collecting, and subsequent "foxing"; and unequal wear and fading of plumage in different environments, those on the arid plains fading and wearing much more quickly and to a greater extent than those in the

northern forests. Because of this I hesitate to assign subspecific values to the observable differences in the present series, though the subspecies has been accepted by the A.O.U. Check-list Committee (1945, Auk, 62, p. 443).

Least Flycatcher. *Empidonax minimus* (Baird and Baird)

Apparently not uncommon locally in the poplar groves along Milk River, and occurs elsewhere in wooded areas on the plains.

In 1920, Taverner recorded the species at Ghost River, July 28 and 29. In 1945, Rand and Clemens recorded one calling in the tree plantations at Brooks on June 28; saw and heard several, probably this species, in the lower edge of the aspen forest on the slopes of the Cypress Hills, July 6, 7; and, July 7-21, saw a number on several days and heard them calling in the groves of big poplars along Milk River, where one specimen, a male with enlarged gonads, was collected. In the eastern edge of the Rocky Mountains the southern locality represented by a specimen is Canmore, on the edge of Banff Park. In Waterton Lakes Park members of this genus were not common, and the specimens collected were not of this species.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂; May 17, 1894; Spreadborough.

Milk River: 1 ♂; July 19, 1945; Rand and Clemens.

Ghost River: 1 ♂; July 28, 1920; Taverner.

Wing, 64.5, 66, 68; tail, 55, 57, 58; exposed culmen, 9.5, 10, 10; tarsus, 16.7, 17, 17.5 mm.

Hammond Flycatcher. *Empidonax hammondi* (Xantus)

In Waterton Lakes Park on August 4, 1945, Rand and Clemens found several little flycatchers, possibly a family group, in a small grove of young aspens in the grass and brush country along Pass Creek. They were sitting up in the tops of the trees, usually on dead twigs, in commanding positions. Occasionally one gave a short two-syllable note.

Two of these birds were collected; they are in fresh autumn plumage; their measurements are as follows:

—	Wing	Tail	Exposed culmen	Tarsus	Middle toe without claw
	Mm.	Mm.	Mm.	Mm.	Mm.
♂.....	66	60	9	18	9.5
Sex?.....	65	60	9	18.1	10

These two birds I would have unhesitatingly referred to *hammondi*, if it were not for the wing formulæ; in both specimens the wing has the first (outermost) primary about 7 mm. shorter than the sixth. The upperparts are rather strongly tinged olive.

We have seven other specimens from Alberta that seem to be *hammondi*, all from Jasper, June 18 to August 4, and one from near Banff, August 26, that seems to be the same. However, only two of these have the first (outermost) primary definitely longer than the sixth; in five others it is subequal or very slightly longer. One specimen, August 3,

Jasper, had begun to renew its flight feathers. However, Moore (1940, *Auk*, 57, p. 350) has shown that the wing formulæ is a somewhat variable character.

Wright Flycatcher. *Empidonax wrightii* Baird

In Waterton Lakes Park, Young collected a single specimen in worn plumage, on May 21, 1923, that is typical of this species as represented by many British Columbia specimens. It is an adult male, wing, 70; tail, 63; exposed culmen, 11; tarsus, 18; middle toe, 10 mm.; the first (outermost) primary is about 5 mm. shorter than the sixth; the underparts are not uniform, the throat being whitish and the belly yellowish white; mandible fuscous.

Our other Alberta material includes three specimens from Jasper (July 25 to September 12); and five specimens from Banff and Canmore, May 20 to July 21.

Western Wood Pewee. *Contopus virens richardsonii* (Swainson)

Strangely, this species was found only along Milk River, where it was common and singing its striking song characteristic of this form in the poplar groves along the river, July 19-24, 1945, and in Waterton Lakes Park where it was scarce; two being seen and heard in 1945, on August 4, in the poplar groves on the edge of the grassland, and where Young recorded two, August 17 and 22, 1922.

None was recorded in the Cypress Hills where there was much apparently suitable habitat; though the species occurs in the Cypress Hills in adjacent Saskatchewan, as two specimens in the National Museum, taken at Cypress Lake, June 10, 1921, by P. A. Taverner and H. M. Laing indicate.

The species is represented in our collection by three specimens from Milk River, July 19, 21, 1945, Rand and Clemens. These compare well with a British Columbia series, though averaging slightly paler.

Although the eastern and western forms are usually treated as two different species, a survey of our material indicates the advisability of combining them as one species. Grinnell (1928, *Condor*, 30, pp. 185, 186) summarized the views of Coues, Ridgway, and himself thus "there is practically complete intergradation by way of individual variation between *richardsonii* and *virens* in structural characters" and suggested they be considered conspecific, despite differences in habits. However, Grinnell and Miller (1944, *Pacific Coast Avifauna*, No. 27, p. 262) do not follow this in their treatment of California birds, though Van Rossem (1945, *Occ. Papers Mus. Zool., Louisiana State Univ.*, No. 21, p. 155) does so.

A survey of the seventy-eight skins in the National Museum indicates that, in addition to the overlap by individual variations already mentioned, there is geographical intergradation; a series of Ontario birds differs rather clearly from a series from British Columbia, but birds from Alberta, Saskatchewan, and Manitoba show an approach to the eastern birds, and certain Manitoba specimens are of doubtful allocation.

This difference, the darkening of western birds, was noticed by Bishop (1900, *Auk*, 17, p. 116) and was the basis of the description of *Contopus richardsonii saturatus*. Rather than recognize this form, which would

result in having two distinct races with a third, poorly defined, intermediate one, it seems advisable to recognize two races only, although realizing there is a broad band of intergradation between the two.

Olive-sided Flycatcher. *Nuttallornis borealis* (Swainson)

To be expected as a breeding bird on the eastern slopes of the Rocky Mountains, at least, but we have only the following records: one seen June 12, 1922, by Young, in Waterton Lakes Park; and a manuscript note of Dr. C. H. D. Clarke, that he saw the species around Waterton and Cameron Lakes in August 1939.

FAMILY—ALAUDIDAE. LARKS

Desert Horned Lark. *Eremophila alpestris leucolaema* Coues.

A common summer resident, breeding. This was one of the commonest and most widespread species. Indeed, horned larks, McCown and chestnut-collared longspurs were the common, widespread species of the dry, open, short-grass prairie. Though frequently found far from water, these birds come regularly to water when it is available.

The earliest spring record for southern Alberta is a specimen from Medicine Hat, April 6 (*See below*). In 1945, the first young of the year, fully fledged, was seen on June 26, and from then on young, strong on the wing, were seen commonly. But later broods also occur, as Soper took a nestling on June 30, 1927, and in 1945 Rand and Clemens took a laying female on July 16.

Specimens, National Museum of Canada:

Milk River and Deer Creek: 9 ♂, 2 ♀, 1 nestling; June 23-July 18, 1927; Soper.
 Dominion Range Station: 1 ♂, 2 ♀; July 14-23, 1945; Rand and Clemens.
 Medicine Hat: 4 ♂; April 6-May 7, 1894; Spreadborough.
 Cassils: 1 ♂; June 24, 1945; Rand and Clemens.
 Caruso: 1 ♀; July 30, 1920; Taverner.
 Wing, ♂ (10), 101-109 (av. 105.4 mm.).

These specimens compare well with a large series of Red Deer River birds. They are small, and pale, compared with *hoyti* that certainly occurs in migration. Compared with *enthymia* of southern Manitoba and southwestern Saskatchewan the present specimens are equally pale but less clear greyish above. Todd (1947, *Ann. Carnegie Mus.*, 30, p. 407) has questioned the validity of *enthymia*.

Horned Lark. *Eremophila alpestris* subsp.

Horned larks of some subspecies occur in Alberta from about the latitude of Calgary southward, in immense flocks in winter, according to a letter from Mr. Frank Farley.

There are three possibilities as to subspecific identity. They may be in part the breeding birds of the plains, or they may be migrants of one or two subspecies. We have a large series of migrants from Wood Buffalo Park that have pale yellow throats and white eyebrow stripes in fresh plumage, and are *E. a. hoyti*. These undoubtedly pass through southern Alberta. We also have a series of *E. a. articola*, with pure white throats, from Jasper where they probably breed, and these may also migrate through the southwest part of the province.

At Waterton Lakes, Young, in 1922, saw no horned larks until September 8 when he recorded fifty.

FAMILY—HIRUNDINIDAE. SWALLOWS

Tree Swallow. *Iridoprocne bicolor* (Vieillot)

Fairly common summer resident in the western part of the area, at the base of the Rocky Mountains; not seen elsewhere.

Taverner saw no tree swallows on his crossing of the plains in 1920. Young, in Waterton Lakes Park, in 1922, recorded the species daily through May and June; and only sporadically thereafter; latest date, August 11. In 1945, July 28 to August 10, Rand and Clemens found the tree swallow very common in the flat country in the eastern edge of Waterton Lakes Park, where they fed over the open country, waterways, and aspen groves, and rested in the trees. Flocks of fifty to one hundred birds were sometimes seen.

Specimen, National Museum of Canada:

Waterton Lakes Park: 1 ♀; July 28, 1945.

Bank Swallow. *Riparia riparia riparia* (Linnaeus)

Apparently very local on the open prairies where cutbanks are available; one nesting colony seen in the Cypress Hills, and occasional birds recorded in summer in Waterton Lakes Park.

In 1920, Taverner saw about twenty near Strathmore on July 31 and August 1.

Rand and Clemens, driving from Bassano to Brooks on June 22, 1945, saw small numbers several times. Apparently they were nesting on cutbanks formed by road construction.

In the Cypress Hills on July 10, 1945, Rand and Clemens visited a hard sand cutbank along the upper part of Battle Creek, and there saw about seventy nesting holes with many birds about.

In Waterton Lakes Park, Young, in 1922, noted occasional birds during the summer.

Rough-winged Swallow. *Stelgidopteryx ruficollis serripennis* (Audubon)

Recorded at only two localities, the Brooks area and at Elkwater Lake.

In the Brooks area rough-winged swallows were apparently not uncommon; on June 23, 1945, Rand and Clemens saw two perched on a fence near Tilley, on the edge of a prairie irrigation ditch; in the town of Brooks, four were seen about a bridge over a canal on June 28; and a lone bird was seen near Cassils on June 26, perched on a fence in a line of brush of an abandoned homestead, on the open prairie.

At Elkwater Lake, on the northern edge of the Cypress Hills, one was seen on July 11 by Rand and Clemens.

American Barn Swallow. *Hirundo rustica erythrogaster* Boddaert

Taverner, in 1920, recorded two between Elkwater Lake and Many Island Lake on August 7.

Greater Cliff Swallow. *Petrochelidon pyrrhonota hypopolia* Oberholser

Common, though somewhat local, over the prairies. The availability of nesting sites determines whether or not this species will be present. Natural sites are provided by the earth walls of river valleys and coulées;

artificial ones by the culverts of the irrigation projects. Irrigation has thus probably increased the numbers of this species on the prairies. In some of the more arid sections it is possible that mud for the nests is available periodically only, after rains.

Crossing the plains in 1920, Taverner recorded the species as follows: August 1, two hundred birds over the irrigated lands between Strathmore and Walsh; August 2, ten birds near Medicine Hat; and August 4, six birds near Lake Pakowki.

In 1945, Rand and Clemens found the species fairly common but local about both the irrigated areas and the arid prairie.

In the vicinity of the irrigated area about Brooks the species was common, apparently nesting under bridges and in culverts of the irrigation projects, and ranging over the open prairie (June 22-28).

In the more arid southeastern corner of the province, from Manyberries to the Dominion Range Station, where badlands occur, groups of these birds were seen at several places on the open prairie on July 13. At some such places there seemed to be no water present, and it is possible that the birds have to wait for rains to dampen the soil so they can make their nests.

About the Range Station itself, July 13-24, there were about seventy-five birds attempting to nest under the eaves of the administration building, and they were common generally over the open prairie and badlands, apparently nesting on the hard, sharp-cut walls of gullies and the badlands.

Two nesting colonies were seen. One was in a gully cut 10 feet deep and less than 10 feet wide, through the hard prairie soil. There were about thirty nests, scattered in small groups where overhangs protected the nests from the rains. The nests blended perfectly with the grey-brown mud of the eroded bank, but were easily located because of the litter of pinkish tinged droppings and egg shells below each. The nests, containing young on July 14, were only 4 to 6 feet above the bottom of the coulée. Another colony, of twenty to thirty nests, was seen on the vertical wall near the top of the valley of Milk River.

Specimens, National Museum of Canada:

Medicine Hat; 1 ♂, May 28, 1894; Spreadborough.

Dominion Range Station: 1 ♂, July 19, 1945; Rand and Clemens.

Milk River: 1 ♀, June 23, 1927; Soper.

Wing, ♂ ad., 109, 112; ♀ ad., 110 mm.

The race *hypopolia* is represented in our material from Manitoba (Whitewater Lake and Shoal Lake) to southern British Columbia (Okanagan Valley) and north to Yukon (Ross River).

In this material, as compared with the eastern race *pyrrhonota*, though there is a slight difference in size, with larger birds in the west, the most constant difference is one of colour; five specimens of *pyrrhonota* differ from twenty birds from Manitoba and westward (*hypopolia*) in having the breast darker, with more of a rusty tinge, and in having the rump averaging darker. There is a slight overlap, but most specimens are separable on these characters. Some western specimens also have the throat and side of the head paler chestnut, but this is not constant.

Wing measurements (chord):

	Male	Female
	Mm.	Mm.
<i>P. p. pyrrhonota</i>		
New Brunswick:		
Miscou Island.....	110	
Quebec:		
Gaspé.....	108	109, 112
Ontario:		
Ottawa.....	110	
<i>P. p. hypopolia</i>		
Manitoba:		
Whitewater and Shoal Lakes.....	109, 114	
Saskatchewan:		
Cypress Lake.....	115	
Alberta:		
Milk River to Red Deer River... ..	109, 112	111
Banff.....		111, 114, 115
Jasper.....		110
Fort Chipewyan.....		113
Lac la Nonne.....		113
British Columbia:		
Okanagan Valley.....	108, 108, 110, 111, 111	
Yukon:		
Ross River.....	116	

Northern Purple Martin. *Progne subis subis* (Linnaeus)

Spreadborough took a male and a female at Medicine Hat on May 16, 1894 (wing, ♂ 154, ♀ 153 mm.).

The species nests in central Alberta, and probably occurs commonly in migration in the southern plains.

FAMILY—CORUIDAE. CROWS AND JAYS

Idaho Canada Jay. *Perisoreus canadensis bicolor* Miller

Occurs in the coniferous forests of Waterton Lakes Park.

Young in 1922 recorded the species only once, on June 17. Rand and Clemens found Canada jays on two occasions in Waterton Lakes Park, July 30 and August 6, 1945. However, information from the park personnel indicates the species is not uncommon.

Specimens, National Museum of Canada:

Waterton Lakes Park: 2 ♂ ad., 2 ♀ ad., 1 ♀ imm.; August 6-26, 1938 and 1945; Anderson, Rand, and Clemens.

Wing, ♂ ad., 145, 146 mm.

In general coloration this series of adults is rather uniform; however, the width of the black band of the occiput varies, and also its forward extent toward the eye. In one specimen the black does not reach the eye, in two it barely reaches the eye, and in one it reaches and incompletely encircles the eye with a white-flecked, narrow rim of black.

For comparison we have a series of *P. c. bicolor*, from Fernie (2); Elko (1); Newgate (1); Midway (2); and Okanagan Valley (5); and a large series of *canadensis* from various localities, including Jasper and Banff. Miller (1933, Trans. San Diego Soc. Nat. Hist., 7, p. 296) has pointed out that an Okanagan bird he had was *bicolor* but with an approach to *canadensis*. The south British Columbia specimens listed above show some variation, but all differ sharply from northern British Columbia *canadensis* as is described for *bicolor*, and are considered *bicolor*. The Waterton Lakes specimens thus are intermediate between *bicolor* and *canadensis* but closer to *bicolor*. Apparently the transition is through a population that is more variable than that of either of the two subspecies.

Though the present series is much more slaty grey than the south British Columbia specimens of *bicolor*, which are quite brownish, this is interpreted as due to the foxing of the latter. Specimens of this species have a pronounced tendency to become brownish with the ageing of the skin. This foxing does not take long; the Waterton Lakes specimens taken in 1938 are already appreciably browner than those taken in 1945.

Two other races occur in Alberta: *P. c. canadensis* in the Rocky Mountain area, and *P. c. albescens* in the coniferous forests of the rest of the central and northern part of the area. However, recent reviews of the species have left a number of confusing issues, so a brief survey of the recognizable races occurring in Canada is necessary.

As noted above, wear changes greatly the plumage of a Canada jay; the feathers not only wear off and become paler, but may become browner, and there is a tendency toward whitish shaft stripes developing with wear, something that is lacking in the fresh plumage of all Canadian subspecies, except *griseus*.

Another factor that must be considered is "foxing." The slaty blue-grey of the freshly-taken skin becomes paler and browner with age; it seems that subspecies described as differing in intensity of brownness or greyness must be carefully checked.

There are four main trends in geographical variation of the Canada jay in Canada.

(1) A slaty and grey bird; back unstreaked; the black of the occiput extending to and encircling the eye; from Nova Scotia and western Quebec, through Ontario, Manitoba, northwestward to Great Bear Lake and Mackenzie, thence over Yukon and British Columbia and western Alberta (south at least to Banff and the Bella Coola area).

(2) A bird with a similar colour pattern but a generally paler coloration, especially pronounced on the underparts; in the dryer area of central Canada, north of the prairies.

(3) A bird from extreme southern British Columbia and southwestern Alberta (Waterton Lakes Park) that is like the first type in intensity of coloration, but differs in the black of the occiput being restricted and not reaching the eye.

(4) A brownish slate and grey bird; the back with conspicuous pale shaft streaks to the feathers; the black of occiput reaching, but usually incompletely encircling the eye; coastal British Columbia, north to the Bella Coola area.

Having outlined the main trends of variation there is the perplexing question of allocating names, due to minor variations providing material for more than four races.

Birds of the first category occupy a very wide range, and there are minor variations observable. Where birds of this type approach geographically the range of birds of the second category, populations intermediate in character occur, as would be expected. Further, the birds of Nova Scotia and New Brunswick tend to have the white of the forehead and throat clearer white, contrasting more with the darker plumage areas.

Another minor trend is a darkening of the plumage, above and below, in birds of the Labrador Peninsula. This trend appears to increase eastward progressively. In the west is a similar trend, in a small area near Bella Coola, but the darkening is less pronounced and evident only on the upperparts. A "lumper" would no doubt recognize the following four names for the four main categories listed above:

<i>P. c. canadensis</i>	<i>P. c. bicolor</i>
<i>P. c. albescens</i>	<i>P. c. griseus</i>

However, the present tendency is to apply names to most demonstrable trends.

With this in mind, the following may be recognized.

P. c. canadensis (Linnaeus)

From Nova Scotia and western Quebec, to Yukon north of the range of *albescens*, and south through British Columbia to the Cariboo district, and Jasper and Banff in Alberta.

The paler birds from northern Mackenzie are here considered as simply a tendency toward the neighbouring *albescens*; and the slight differentiation of Nova Scotia birds is ignored. Aldrich (1943, Wilson, Bull. 55, p. 220) has assigned the birds of central British Columbia and the mountains of western Alberta to *connexus*, but our material from Banff and Jasper is indistinguishable from *canadensis* from Ontario. Aldrich has also included the Yukon, and northern British Columbia birds in *fumifrons*; but I am unable to see constant differences.

P. c. nigricapillus Ridgway

From Moisie Bay to Bonne Esperance and northward, probably to edge of timber.

Differs from *canadensis* in the slightly darker colour above and below, on the average.

This appears to be the oldest name for the population of the eastern Ungava peninsula that exhibits a slight but apparently progressive darkening eastward. Hellmayr (1934, Field Mus. Nat. Hist., Zool. Ser. 13, pt. 7, p. 66) has already synonymized *sanfordi* with *nigricapillus*. The name *barbouri* seems to be simply a stage of this progressive eastward darkening. The ascribed differences of tone, brown or grey, change so with age of specimen that I hesitate to place any reliance on such characters. Hellmayr (op. cit., p. 68) has already suggested *barbouri* might well be reduced to synonymy.

Occasional eastern Ontario specimens are as dark as many *nigricapillus*.

Perisoreus canadensis albescens Peters

Central and northern Alberta (except the Rocky Mountains area), southern Mackenzie, and northern Saskatchewan. Riding Mountain area of Manitoba and Great Bear Lake specimens are intermediate between this form and the *canadensis*, but closer to the latter.

This race is clearly differentiated from *canadensis* in the plumage being paler, especially below.

Miller (1933, Trans. San Diego Soc. Nat. Hist., 7, p. 296) has suggested that *albescens* meets and intergrades with *bicolor* in northern Montana and Alberta, but Canada jays are absent from the plains, and in Canada *albescens* meets only *canadensis*, with which it intergrades.

Perisoreus canadensis pacificus Miller

The mountains of the Bella Coola area of western central British Columbia.

Barely distinguishable from *canadensis* on the basis of the average slightly darker upperparts; differs slightly from *nigricapillus* in the paler underparts.

Perisoreus canadensis bicolor Miller

From extreme southern British Columbia west at least to the Okanagan Valley and into extreme southwestern Alberta at Waterton Lakes Park where a tendency toward *canadensis* is observable. The black of the occiput ordinarily being narrow and not reaching to the eye distinguishes this from all the preceding forms.

Perisoreus canadensis griseus Ridgway

Coastal British Columbia, north to the Bella Coola area and inland to Lillooet.

Sharply differentiated from other Canadian races by the whitish shaft streaks of the dorsal feathers.

Though Aldrich described *connexus* as a race intermediate between the *obscurus-griseus* type of bird and the *canadensis* type, and mapped its range north to central British Columbia, our material does not show any tendency toward intergradation of *griseus* with *canadensis*. As to what happens in Oregon, where the type locality of *connexus* is located, I have no material to indicate.

It is interesting in this connection that birds in very worn plumage from as far east as Manitoba may have white shaft streaks on the dorsal feathers, a character acquired with wear and absent from fresh specimens.

A considerable amount has been written on variation in the Canada jay, and its possible history, notably by Austin (1932, Mem. Nuttall Ornith. Club, 7, pp. 158-164), who gives a needlessly involved hypothesis to account for the facts.

It is probable that the separation of the *capitalis-bicolor* group, and of the *obscurus* group, from birds of *canadensis* type of plumage can be correlated with Pleistocene glaciation. But the variation within the *canadensis* group in Canada, including *canadensis*, *nigricapillus*, *pacificus*, and *albescens*, could all have occurred in situ in response to the local environment.

Black-headed Steller Jay. *Cyanocitta stelleri annectens* (Baird)

Apparently fairly common in winter east to the foot of the Rocky Mountains in Waterton Lakes Park, coming commonly to be fed in the townsite there. According to local report, a few summer in the park.

Young, in 1922, secured no record of the species. In 1938, Dr. R. M. Anderson on a visit to Waterton Lakes Park collected a female on August 26.

In 1945, Rand and Clemens saw no Steller jays, but were told by Mr. DeVeber that they came commonly about the townsite in winter, where they were fed by the residents; and several people spoke of seeing them in the mountain forests during the summer of 1945.

The single specimen is a female, largely in first winter plumage, wing 153, and compares well with interior British Columbia specimens.

Southwestern Alberta, north at least to Banff, where Clarke and Cowan recorded the species (1945, *Can. Field-Nat.*, 59, p. 96), will need to be added to the range of this species.

American Magpie. *Pica pica hudsonia* (Sabine)

Though the magpie is usually spoken of as common in the forest edges, about areas of brush, and near trees on the plains, the records indicate it as only fairly common over all this area.

Taverner, in 1920, in crossing the plains, recorded the species on three days only: near Medicine Hat he saw fifteen on August 3; near Elkwater Lake, he saw about fifteen on August 6; and a single bird near Many Island Lake on August 7.

Rand and Clemens, in 1945, also found the species less common and conspicuous than general reports led them to expect. When motoring from Calgary to Brooks, about a dozen birds in all were seen on June 22. During the period June 23-28, while staying near Cassils, in a cabin on the shores of one of the projects of Ducks Unlimited, they found one nest containing five eggs, in a line of willows near an abandoned farm on June 26; and saw a party of one adult and five young, the latter with their tails about two-thirds grown, on June 28. Otherwise, the species was scarce in the Brooks area, though constant persecution may have had an effect.

Motoring from Brooks to Medicine Hat, on June 23, and from Brooks to Elkwater, June 29, none was seen after leaving the irrigated area of the Eastern Irrigation district.

In the Cypress Hills a number of magpies, from six to twelve, came regularly each morning about the park ranger's station, and numbers were seen about the ranches visited; but otherwise the species was seldom seen, July 1-13, 1945.

In the Dominion Range Station area, about ten were seen commonly around the irrigation station grounds itself. None was seen out on the open plains. Only a few, and some old nests, were seen in the brush and poplars lining Milk River.

Magpies were common in the mixed aspen and grass country in the eastern edge of Waterton Lakes Park; Young, in 1922, noted it in numbers up to ten throughout his stay from mid-May to September 21. In 1945, Rand and Clemens found it common usually in parties of six to eight, July 27 to August 11.

Specimen, National Museum of Canada:

Milk River: 1 fledgling; June 24, 1927; Soper.

Raven. *Corvus corax* subsp.

Evidently rare in Waterton Lakes Park where Young recorded two on June 27, 1922.

Western Crow. *Corvus brachyrhynchos hesperis* Ridgway

The crow, depending on trees for nesting, is common in the forest edge where the treeless plains meet the forests of the Rocky Mountains, in the extreme western part of southern Alberta, and is fairly common in the Cypress Hills. But over most of the prairie country of southern Alberta the species is scarce, nesting presumably in planted trees; and in the extreme southwest occurs only in migration. Many available nesting sites are not used.

Taverner, crossing the plains by motor car in 1920, saw from four to twelve birds daily. In 1945, Rand and Clemens found the species scarce from Calgary to the Cypress Hills, seeing only two birds between Brooks and Medicine Hat on June 23 and again on June 29.

In the forests of the Cypress Hills the species was fairly common, several pairs being seen daily during a morning's walk, June 30 to July 13. The first flock, about six birds, was seen on July 5. Judging by the actions of the adults and the calling of young, most young were still in the nest on July 11.

On July 13, motoring from the Cypress Hills to the Range Station, occasional birds were seen where there were irrigation projects with trees, but about the Dominion Range Station itself none was seen. The plantings of trees had not yet attracted crows to nest, and none was seen over the prairies or along the poplars fringing Milk River. Mr. H. Hargrave told us that crows occurred here only in migration. Apparently many clumps of trees that could serve as nesting places are not so used.

In Waterton Lakes Park the scattered aspen groves on the edge of the plains were evidently very favourable habitat. Young, in 1922, found crows common throughout the summer season, listing ten to twenty birds daily until the first of August, after which fifty to one hundred were recorded daily. In 1945, July 27 to August 10, crows were also recorded commonly in Waterton Lakes Park. They were seen in pairs and small parties feeding out on the prairies and about the garbage dumps, and occasionally larger flocks of about one hundred birds were seen. By early August lines of flight in the evenings indicated the birds were gathering into communal roosts.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂ ad., 1 ♀ ad.; April 21, 23, 1894; Spreadborough.

Cypress Hills: 2 ♀; July 2, 9, 1945; Rand and Clemens.

Waterton Lakes Park: 1 ♂ ad., 1 ♀ ad.; May 26, June 13, 1922; Young.

Wing, ♂, 301; ♀, 282, 296, 307 mm.

Culmen, ♂, 45, 45; ♀ 45, 45, 46 mm.

Northern Alberta birds average slightly larger and their bill larger and slightly heavier.

The measurements of other Alberta birds are as follows:

	Male		Female	
	Wing	Culmen	Wing	Culmen
	Mm.	Mm.	Mm.	Mm.
Wood Buffalo Park.....			309, 310	45, 45
Lac la Nonne.....	306, 310	49, 50		
Edmonton.....	311	49		
Jasper.....	314	50		
Alexo.....	315	49		
Red Deer River.....	304	49	303	44
Morrin.....			294	43

On the basis of the bill size of the males, it seems advisable to consider *brachyrhynchos* as extending as far south as Red Deer River, though the small size of the females indicates these populations may be intermediate.

For comparison the following are the measurements (in mm.) of specimens from southeastern Ontario:

Wing, ♂ (10), 306-328 (av. 315.3); ♀ (6), 290-320 (av. 306.5)
 Bill, ♂ (10), 47-52 (av. 49.9); ♀ (6), 46-52 (av. 48.8)

Undoubtedly in migration the birds of northern Alberta, referable to *C. b. brachyrhynchos*, migrate through all southern Alberta.

Clark Nutcracker. *Nucifraga columbiana* (Wilson)

Common during the summer in the higher coniferous forests of Waterton Lakes Park; said to descend to the edge of the plains in winter.

In 1922, Young recorded the species occasionally throughout the summer. In 1945, Rand and Clemens found the species common, and its whining calls, one of the characteristic sounds of the coniferous forests at higher altitudes, August 1-10.

Specimens, National Museum of Canada:

Waterton Lakes Park: 2 ♂ ad.; May 20, 1922, August 8, 1945; Young, Rand, and Clemens.

FAMILY—PARIDAE. TITMICE

Long-tailed Black-capped Chickadee. *Parus atricapillus septentrionalis* Harris

Common in the Cypress Hills, along Milk River, and in Waterton Lakes Park, where there was natural forest or tree habitats; naturally absent from most of the area that is plains, and slow to accept planted groves as summer habitat.

Though chickadees may nest in some of the older, larger groves of trees planted about irrigation projects, none was seen, and they were certainly absent from those about the Dominion Range Station. Perhaps the absence of dead stubs, suitable for nesting sites, was the reason.

In the Cypress Hills this chickadee was one of the commonest birds in the spruce, pine, and aspen forests, July 1-10. In the groves of poplars along Milk River chickadees were fairly common, July 19-24, 1945.

In Waterton Lakes Park, Young had only one record in 1922, of two seen on May 22; but Rand and Clemens found the species fairly common in the poplar and aspen flats in the eastern edge of the park, and not uncommon in the mixed coniferous forests on the lower slopes of the Rocky Mountains, July 28 to August 9, 1945.

Specimens, National Museum of Canada:

Cypress Hills: 1 ♂ ad., 2 ♀ ad.; July 1-4, 1945; Rand and Clemens.

Milk River: 1 ♂ imm.; July 24, 1945; Rand and Clemens.

Waterton Lakes Park: 1 ♂ imm., 1 ♀ ad., 1 ♀ imm.; July 28-August 4, 1945; Rand and Clemens.

Adults: wing, ♂, 66; ♀, 66, 67 mm.; tail, ♂, 65; ♀, 67, 67 mm.

These specimens in colour differ from eastern *atricapillus* in paler coloration and more conspicuous white edgings of remiges and rectrices and wing coverts, and compare well with a Colorado specimen of *septentrionalis*. For comparative measurements see table on page 59.

The variation in the black-capped chickadee in Canada is fairly evident from the material at hand, except for the Mackenzie district and Yukon, from which areas material is largely lacking.

In the east, from Nova Scotia to southeastern Ontario at least is a relatively short-tailed bird. In northern Ontario, the species averages paler, but remains the same in size (Duvall). In western Ontario (Lac Seul) there is an increase in size, but no change in colour. From Manitoba westward to Alberta the birds are larger, with longer tails, and paler in coloration, with more conspicuous white edgings to the wings and coverts, and rectrices; in north British Columbia, there is a slight decrease in size, and perhaps a slight increase in darkness; and in southern interior British Columbia, there is a further decrease in size and a slight additional darkening, with birds practically indistinguishable from eastern Canadian material. The extreme in small size and darkness for the species is reached in the coastal area of southern British Columbia.

The names to use in the taxonomy of this group have been thoroughly discussed. Taverner earlier (1940, *Auk*, 57, pp. 536-541) compared eastern and western birds, and decided there was no significant differences between what had been called *atricapillus* and *septentrionalis* in Canada, apparently advocating the use of only two subspecific names for Canadian birds, *P. a. atricapillus* and *P. a. occidentalis*. Duvall (1945, *Auk*, 62, pp. 49-66) advocated the use of five racial names: *atricapillus*, *anamesus*, *fortuitus*, *occidentalis*, and *turneri*.

Though Duvall's recognition of the main trends of variation appears substantially correct, there is some question as to his allocation of names. These I mention below in briefly reviewing the races.

Parus atricapillus atricapillus Linnaeus. The eastern form, ranging west at least to Lac Seul in western Ontario, and James Bay. Intergradation with *septentrionalis* occurs in size in the former locality; in colour in the latter.

Parus atricapillus septentrionalis Harris. A larger bird, with a longer tail; averaging slightly paler and with whiter and larger edgings to the remiges, rectrices, and wing coverts; ranging from Manitoba (Whitewater Lake to Reader's Lake) to Alberta, northern British Columbia (south to Telkwa, Vanderhoof, and Hazelton) and probably Mackenzie and Yukon.

The birds from Manitoba to Alberta seem fairly uniform; those from northern British Columbia show a slight decrease in tail size, and a slight increase in darkness. Duvall's use of *anamesus* seems based on the belief that there is a sizable population with coloration more like *septentrionalis* but measurements like *atricapillus*. Apparently such *anamesus*-like birds are restricted to a small area in northern Ontario. To recognize every such area of intergradation would necessitate many other names and is impracticable. Duvall says Alberta birds are too small for *septentrionalis*, but see measurements below. Duvall does not record *septentrionalis* from either Mackenzie or Yukon, but comments (p. 66) that the specimens he saw looked like *septentrionalis* or were unidentifiable. Until further evidence is at hand, it is advisable to consider them *septentrionalis*.

Parus atricapillus fortuitus (Dawson and Bowles). Very similar to *atricapillus* in colour and size, but averaging very slightly paler and with very slightly whiter edgings on wing and tail; ranging in southern British Columbia northwest to Lillooet (tending toward *occidentalis*) and northeast to Revelstoke.

The advisability of recognizing this race is questionable. It represents intergradation between pale *septentrionalis* and dark *occidentalis*, and hence resembles *atricapillus*. If its range were contiguous with that of *atricapillus* it would be combined with the latter. But presumably being of quite different origin, and having a slight degree of differentiation over a considerable area, remote from the range of *atricapillus*, it is probably advisable to recognize it by name.

Duvall recorded a specimen from Waterton Lakes, Montana, as this form. Our material from the contiguous Waterton Lakes Park in Alberta, though scanty, is better referred to *septentrionalis*.

Parus atricapillus occidentalis Baird. Considerably darker and browner, and with a shorter tail than *atricapillus*; ranging only in extreme southwestern British Columbia; our specimens are from Chilliwack, Huntingdon, Douglas, Burrard Inlet near Vancouver, and Agassiz.

Parus atricapillus turneri Ridgway. Irrespective of the status of this race in Alaska, Duvall has shown no evidence for extending the range of a pale Alaska form to Yukon and Mackenzie, and the data he gives for these areas (p. 66) are better interpreted as applying to *septentrionalis*.

Measurements of *Parus atricapillus*

Male		Female	
Wing	Tail	Wing	Tail
Mm.	Mm.	Mm.	Mm.
<i>atricapillus</i> (from Duvall, p. 52)			
(36) 60-67.5 (av. 65.1)	(36) 58.5-66 (av. 62.1)	(31) 60-67 (av. 63.4)	(31) 57-64 (av. 60.5)
"anamesus" (from Duvall, p. 56)			
(14) 63-67 (av. 64.9)	(14) 60-66 (av. 62.6)	(12) 61.5-66.5 (av. 63.4)	(12) 56.5-63.5 (av. 61)
<i>atricapillus</i> (Lac Seul, Ont.)			
67, 67	66, 67	.....	.....
<i>septrionalis</i> (Manitoba (Whitewater Lake to Thicket Portage))			
(4) 66-68 (av. 67.5)	(4) 65-70 (av. 67.2)	(10) 62-65 (av. 63.8)	(10) 61-67 (av. 64.4)
<i>septrionalis</i> (Alberta (Cypress Hills to Wood Buffalo Park))			
(14) 65-70 (av. 67.2)	(15) 63-72 (av. 67.5)	(10) 62-67 (av. 64.3)	(8) 62-67 (av. 65)
<i>septrionalis</i> (north British Columbia (Telkwa, Vanderhoof, Hazelton, Nelson, Liard River))			
(7) 66-69 (av. 67.5)	(7) 65-68 (av. 65.8)	62, 62, 63	61, 63, 64
<i>septrionalis</i> (from Duvall, p. 59)			
(62) 64.5-73 (av. 68.7)	(62) 63-72.5 (av. 67.4)	(30) 64-71 (av. 67.2)	(30) 64-71 (av. 64.2)
<i>fortuitus</i> (south interior British Columbia)			
(10) 64-69 (av. 66.2)	(10) 62-66 (av. 63.6)	(9) 60-65 (av. 62.2)	(9) 58-63 (av. 61.2)
<i>occidentalis</i> (coastal south British Columbia)			
61, 62, 62, 63, 63	56, 56, 57, 58, 59	59, 59, 61, 61	54, 55, 56, 57

Grinnell Mountain Chickadee. *Parus gambeli grinnelli* (Van Rossem)

Recorded only in the coniferous forests of Waterton Lakes Park.

In 1922, Young recorded the species in Waterton Lakes Park on May 15 (one bird); July 12 (two); and July 24 (three). In 1945, Rand and Clemens found a small flock gleaning through the low pines in Akamina Pass near timber-line, on July 30.

Specimens, National Museum of Canada:

Waterton Lakes Park: 1 ♀, 1 sex?; July 12, 1922, July 30, 1945; Young, Rand, and Clemens.

FAMILY—SITTIDAE. NUTHATCHES

Red-breasted Nuthatch. *Sitta canadensis* Linnaeus

Common in the coniferous forested areas of the Cypress Hills, and in Waterton Lakes Park; also nested in a plantation of trees in the Brooks area.

Mr. T. Randall, in late June 1945, showed Rand and Clemens where a red-breasted nuthatch had nested that year in a mixed deciduous-coniferous grove of trees that had been planted in the Brooks area. The species was not seen elsewhere in plantations. Possibly the planting of conifers had brought this species here as a nesting bird.

In the spruce and pine forests of the Cypress Hills, June 29 to July 10, 1945, the red-breasted nuthatch, along with the black-capped chickadee and the junco, was one of the common birds. It also ventured into the aspen forests, but was less common there.

In Waterton Lakes Park, Young, in 1922, recorded singles and pairs throughout the summer; and Rand and Clemens, July 28 to August 11, 1945, found this species fairly common from the aspen groves at the base of the mountains to the stunted conifers near timber-line.

Specimens, National Museum of Canada:

Cypress Hills: 1 ♂, 3 ♀; July 1-9, 1945; Rand and Clemens.
Waterton Lakes Park: 1 ♀; May 24, 1922; Young.

FAMILY—CINCLIDAE. DIPPERS

Dipper. *Cinclus mexicanus unicolor* Bonaparte

Recorded on the rapid mountain streams of Waterton Lakes Park.

In 1922, Young recorded the species occasionally between July 25 and September 1; in 1945, Rand and Clemens found a family party about the pool below Cameron Falls. Several fully fledged young were sitting about on the edge of the pool, and were fed periodically by an adult, August 5-7.

FAMILY—TROGLODYTIDAE. WRENS

Western House Wren. *Troglodytes aedon parkmanii* Audubon

A common summer resident about the aspen forest of the Cypress Hills, the poplar groves along Milk River, and the aspen groves of Waterton Lakes Park; nest in the old tree plantations of the Brooks irrigated area.

The presence of trees, some of them with cavities big enough for the house wren to nest in, probably determines the distribution of this species.

In the Brooks irrigated area, where there are old plantations of trees, it was fairly common about the town, June 28, 1945, but was not seen in other plantations.

In the aspen forests about the edge of the Cypress Hills, and where there were large willows along Elkwater Lake shore, the species was common and singing, June 30 to July 11, 1945. Taverner also noted the species here on August 6, 1920.

The house wren was naturally absent from the open prairie, but along Milk River south of the Dominion Range Station, where there were groves of poplars and clumps of dense shrubbery, it was common and still singing July 19-24, and the young were presumably not yet out of the nests.

In Waterton Lakes Park, July 27 to August 6, 1945, the favourite habitat of the house wren was the aspen and the poplar groves in the eastern part of the park.

Specimens, National Museum of Canada:

Cypress Hills: 4 ♂ ad.; July 7-11, 1945; Rand and Clemens.

Waterton Lakes Park: 1 ♂; July 28, 1945; Rand and Clemens.

Medicine Hat: 2 ♂; May 19, 21, 1894; Spreadborough.

Western Winter Wren. *Troglodytes troglodytes pacificus* Baird

In southern Alberta, probably restricted to the coniferous forests of the Rocky Mountains in the west. We have only one record, a bird taken August 2, 1923, by Young at Bertha Creek, Waterton Lakes Park. The specimen is in the spotted juvenal plumage. In this plumage birds from Quebec show little difference as compared with coastal British Columbia birds, but a Banff Park juvenal (August 17) is acquiring its first winter plumage, and it exhibits the richly tawny throat of *pacificus* as compared with the paler eastern *hiemalis*.

Common Rock Wren. *Salpinctes obsoletus obsoletus* (Say)

Common in the badlands country of extreme southeast Alberta.

Where erosion has cut small gullies in the arid plains, giving earth walls, or has produced the confusion of rocks and banks of the badlands, there the rock wren was found. It was common in the country generally about the Dominion Range Station and to Milk River. From July 14-24, 1945, they were usually seen in parties of adults with young, strong awing but still being fed. However, one nest containing two eggs was also seen on July 15. It was under a boulder with an entrance tunnel about 6 inches long, and with a little area paved with stones at its entrance, which attracted attention to it.

The rock wren was very conspicuous, the family parties scurrying and flying along ahead of one, up the edge of a coulée, hopping in and out of little caves and giving their penetrating warning call, and occasionally breaking out into a chorus of shorter calls. Their neighbours here were the Say phoebe, cliff swallows, rough-legged hawk, occasional lark sparrow, and rattlesnakes.

Specimens, National Museum of Canada:

Dominion Range Station: 1 ♂ ad., 2 ♀ ad., 3 ♀ imm.; July 14-24, 1945; Rand and Clemens.

FAMILY—MIMIDAE. THRASHERS, MOCKINGBIRDS, ETC.

Catbird. *Dumetella carolinensis* (Linnaeus)

Locally common in older plantations of trees, and in larger natural areas of brush and trees, west to the foot of the mountains.

In the planted shrubbery of the town of Brooks catbirds were fairly common, and several were seen and heard on June 28, 1945.

The species was present, but not common in the shrubbery of the northern edge of the Cypress Hills near Elkwater Lake, July 5-11, 1945; and in 1920, Taverner found the species in the shrubbery along Manyberries Creek on August 5.

None was present in the plantation of trees and shrubbery about the Dominion Range Station, but along Milk River to the south, in the dense shrubbery about the poplar groves, the species was fairly common July 19-21, 1945, and about eight were seen one morning.

In Waterton Lakes Park, Young saw occasional birds during the summer of 1922; and Rand and Clemens heard it occasionally, and saw one in deciduous shrubbery on August 5, 1945.

Specimens, National Museum of Canada:

Milk River: 1 ♀ ad.; July 20, 1945; Rand and Clemens.
 Medicine Hat: 2 ♂ ad.; May 19, 23, 1894; Spreadborough.
 Waterton Lakes Park: 1 ♀ ad.; June 26, 1923; Young.
 Wing, ♂, 89, 95; ♀ 90, 91.

Aldrich (1946, Proc. Biol. Soc. Wash., 59, p. 132) has recently described the western catbird as *ruficrissa*, on the basis of its paler ventral coloration.

From an examination of the series in the National Museum, there is no doubt that the birds from Manitoba westward average paler than those from southeastern Ontario, Quebec, and Michigan. The abdomen in particular averages more whitish; the differences in the colour of the crissum is less constant but also averages paler.

In attempting to evaluate the validity of the recently described *ruficrissa*, I laid out the birds from each province in two series, a darker and a lighter; the darker specimens from the east were clearly distinct from the paler birds from Manitoba westward; the paler birds from Ontario were not distinguishable from darker birds from Manitoba westward. The numbers in each series are as follows:

	Male			Female		
	Dark	Medium	Pale	Dark	Medium	Pale
Ontario, Quebec, Michigan.....	4	2	.....	4	2	.....
Manitoba.....	2	3	.....	.....	2
Saskatchewan.....	2	3	.....	.....	.....
Alberta.....	2	2	.....	3	2
British Columbia.....	3	3	.....	.....	3

From this, in the males, two (33 per cent) out of six eastern specimens are indistinguishable from nine (45 per cent) out of twenty specimens from Manitoba westward; with the females, two (30 per cent) out of six eastern birds are indistinguishable from three (30 per cent) out of ten specimens from Manitoba westward.

Although the above figures support the view that there are average differences between birds from the east and those from Manitoba (Clear Lake, Dauphin, Swan River, Shoal Lake) westward, the difference is not constant enough to recognize populations by name. However, it is possible that in the United States, eastern and western populations may differ to a greater extent.

Brown Thrasher. *Toxostoma rufum* (Linnaeus)

Uncommon to common locally in the shrubbery of the irrigated areas, the natural shrubbery of the Cypress Hills and Milk River.

In the town of Brooks, where irrigation and plantings have given a wide variety of shrubs, the brown thrasher was common, and on a walk about the outskirts of the town on June 28, 1945, Rand saw or heard fifteen to twenty birds. The presence of the bird here is due to the introduced shrubbery, of course, but all planted shrubbery did not harbour this species, it being absent from the shrubbery about the Dominion Range Station.

On the north edge of the Cypress Hills thrashers were present in the tangled shrubbery along the margin of Elkwater Lake, but only two or three were seen or heard in a morning's walk there, July 7-11. None was seen in the Cypress Hills themselves.

In the dense prickly shrubbery along Milk River the thrasher was fairly common on one stretch of river, but absent from another (near Comrey), July 20, 21. One young out of the nest was seen on July 20, when about eight adults were seen in all.

Specimens, National Museum of Canada:

Medicine Hat: 2 ♂ ad.; May 12, 14, 1894; Spreadborough.

Milk River: 1 ad., 1 ♀ ad.; July 21, 1945; Rand and Clemens.

The following is the table of measurements of western birds in the National Museum, and the measurements of a series of birds from Ontario, made in the Royal Ontario Museum of Zoology, Toronto.

	Male		Female	
	Wing	Tail	Wing	Tail
	Mm.	Mm.	Mm.	Mm.
Alberta.....	105, 107, 113, 118	121, 124, 138, 138	106	125
Saskatchewan.	104.5	128		
Manitoba.....	105, 106, 106	126, 127, 127	(5) 100-109 (105)	(5) 123-128
Ontario.....	(28) 100-109 (104.8)	(28) 117-135 (126.3)	(12) 96-109 (101.7)	(12) 116-133 (av. 126.4) (12) 116-133 (av. 123.8)

The worn western birds are very much paler than birds in comparable plumage from the east, but wear probably proceeds much more quickly in the bright, arid conditions of the plains. Though a western race, *longicauda*, has been recognized on the basis of its longer tail, the measurements indicate that variability is great, and the average difference is slight, and the recognition of two races on size is hardly justifiable. Certainly, with two races recognized, the identification of most individual birds in migration would be impossible.

FAMILY—TURDIDAE. THRUSHES, ETC.

Western American Robin. *Turdus migratorius propinquus* Ridgway

Robins are naturally absent in summer from most of this area that is treeless, but about the Brooks area, where there have been many trees planted, it was common and apparently breeding, June 22-28, 1945. It was also a common breeding bird in and about the forested area of the Cypress Hills, where both adults and fledglings were taken in July. Farther south only three robins were seen, and these were in the poplar forest along Milk River, July 20, 1945. Mr. H. Hargraves of the Dominion Range Station told Rand that robins occur commonly in migration there, but none remains to nest about the trees planted on the ranches and about the irrigation projects. Our observations seem to support this.

In Waterton Lakes Park the species was common all summer in 1922 according to Young, and in 1945 was fairly common from the edge of the prairie to near timber-line (July 27 to August 9).

Taverner, in his "Birds of Canada" 1924, and the 1931 A.O.U. Checklist gives the range of this form in Canada as only including southeast British Columbia.

The following Alberta material in the National Museum is referable to this form:

- Milk River: 1 ♂; July 21.
- Deer Creek: 1 ♀; July 17.
- Cypress Hills: 2 ♂ ad., 2 fledglings; June 30-July 7.
- Medicine Hat: 3 ♂; April 28-May 11.
- Little Sandhill Creek (Red Deer River): 3 ♀; September 7-19.
- Waterton Lakes Park: 1 ♀; June 26.
- Banff: 1 ♂, 1 ♀; May 19.

and, in addition, British Columbia specimens from the following localities are also referred here: Fernie; Midway; Revelstoke; Trail; and Vasseau Lake.

Comparing this south Alberta material with specimens from north Alberta (Edmonton, Lac la Nonne, Wood Buffalo Park), the adult males average slightly larger (7) 130-144 (av. 136.5 mm.) against (9) 129-136 (av. 132 mm.) with much smaller terminal spots white in the outer tail feathers (greatest extent, from forward edge direct to margin (7) 0-5 (av. 1.9 mm.) against 5-12 (av. 8.8 mm.)); the adult males and females in spring plumage average slightly paler above than north Alberta material; there are no autumn birds available from northern Alberta, but the south Alberta autumn specimens are considerably paler and greyer and less brownish than autumn birds from Ontario. From this it appears that southern Alberta, north to Banff and Red Deer River, must be added to the range of this form.

Presumably southern Saskatchewan specimens might be this form also, but our only specimen, Indian Head, April 19, male adult, has a wing of 132 mm. and extent of white in tail of 8 mm. and, though rather pale, is best referred to *T. m. migratorius*.

Farther east, *T. m. propinquus* might be expected also in south Manitoba. An examination of specimens from Shoal Lake, Oak Lake, and Whitewater Lake, shows that although certain specimens have the white in the tail much reduced, on the average in this character, and in colour, they are closer to *migratorius*.

It is possible that *T. m. migratorius* occurs in migration in south Alberta; but our most southern Alberta specimens are two from Jasper (males, June 28, July 1) with wings of 130 + and 132, extent of white in tail 5 and 7 mm., and are rather dark, and one Red Deer River specimen, a female juvenile, September 21, with 13 mm. of white in the tail and a brown back, that was probably a migrant.

Northern Varied Thrush. *Ixoreus naevius meruloides* (Swainson)

In Waterton Lakes Park, Young recorded one on June 21, 1922.

Our Alberta specimens are a male, taken at Lac la Nonne, September 27, 1926, and one from Banff, August 23, 1945. Lacking female specimens from Alberta, the allocation of Alberta to the range of *meruloides* is on the basis of the literature.

The males show little or no geographical variation, but the females of the two races, in the National Museum, are quite distinct in the greyer, less brownish colour of the back of *meruloides*. The National Museum needs specimens of females from the east slope of the Rocky Mountains.

Hermit Thrush. *Hylocichla guttata* subsp.

Breeds in Waterton Lakes Park; apparently uncommon.

Young, in 1922, recorded the species on June 2, and several times in August. In 1945, Rand and Clemens collected a fledgling with a short tail, and barely able to fly, on July 30.

This juvenal is much darker and more blackish on the back, with a reduction of the brownish tones compared with specimens from Jasper in similar plumage.

The trends of variation in this species in Canada seem fairly clear. A medium dark, brownish olive bird ranges from Nova Scotia to Alberta, and probably northeastern British Columbia; to the south, through interior British Columbia, the species becomes considerably greyer; to the northwest, in northwestern British Columbia and Alaska the colour becomes slightly less brownish, more olive, and there is a decrease in size; in coastal British Columbia there is also a decrease in size, an intensification of the colour, and an increase in the brown in the plumage.

Though details of range and areas of intergradation remain to be worked out, it seems that four subspecific names are sufficient to use, as follows: *H. g. faxoni* Bangs and Penard for the eastern bird (ranging west to northern British Columbia); *H. g. guttata* for the Alaska birds, *H. g. sequoiensis* (Belding) for the bird of the southern interior of British Columbia, and *H. g. nannus* for the coastal British Columbia bird.

The range of *H. g. auduboni* is sometimes given as including part of southeastern British Columbia. It is characterized as like *sequoiensis* but larger, ♂ wing 97-106, (av. 102.4 mm.) against ♂ wing 90-97 (av. 92.82 mm.) (Ridgway). The measurements of the south British Columbia material available are as follows: wing, male (6) 91-93. They are all June and July specimens and presumably breeding. Their wings are somewhat worn, and when fresh might have measured a millimetre or two longer. They come from southeastern British Columbia (Lower Arrow Lake, Trail, Rossland), and if *auduboni* occurred in Canada, one would expect these would represent that race. As they agree so much better with the measurements of *sequoiensis*, all greyish southern interior British Columbia birds

are best referred to *sequoiensis*. It is possible that *sequoiensis* extends into southwestern Alberta, in the Waterton Lakes Park area, following the pattern set by some other species, but material is lacking to decide this point, and the significance of the single darker juvenal available is not apparent.

Other Alberta material at hand indicates that specimens from the northern part of the province are referable to *faxoni*, though they average slightly less reddish brown above and slightly less buffy below than do a series from Ottawa. The material from Jasper and Banff is either very worn or juvenal, and not reliable for comparison, but appears referable to *faxoni*, as does a Red Deer River bird taken September 22, 1917.

Olive-backed Thrush. *Hylocichla ustulata swainsoni* (Tschudi)

Summer resident in Waterton Lakes Park; probably migrates throughout.

Young, in 1922, recorded the species from May 23 to September 21. Rand and Clemens heard it singing on August 3, 1945, when one adult female was collected; another bird was seen on August 6. Evidently migrates generally throughout southern Alberta, judging by the spring migrants collected by Spreadborough.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂, 2 ♀; May 17-24, 1894; Spreadborough.

Waterton Lakes Park: 1 ♀; August 3, 1945; Rand.

These specimens, compared with a series of worn birds from Ontario and eastward, average slightly greyer. Comparing the large series of specimens in the National Museum, the species is divisible rather clearly into a russet-backed form from the Pacific coast (*H. u. ustulata*), and a more olive-backed series from interior British Columbia eastward. There is also slight geographic variation in the olive-backed birds, fresh-plumaged autumn specimens from British Columbia and Manitoba averaging slightly greyer than those from farther east. Presumably the name *H. u. almae* Oberholser could be applied to them. I have seen no topotypical *almae*, but the differences in the Canadian population seem so slight that even though the greyer birds of the interior are not intermediate between the eastern and western birds, it seems inadvisable to recognize by name the greyer Canadian series as different from the eastern, more olive bird.

Grey-cheeked Thrush. *Hylocichla minima minima* (Lafresnaye)

We have only a single record; a specimen, Medicine Hat, May 17, 1894, by W. Spreadborough. It is a male and measures: wing, 108 mm., tail, 74 mm.

Willow Thrush. *Hylocichla fuscescens salicicola* Ridgway

A common summer resident of the aspen forests of the Cypress Hills, and in Waterton Lakes Park.

In the aspen forests of the lower part of the Cypress Hills, July 6-9, 1945, the willow thrush was heard singing and several were seen; in Waterton Lakes Park, Young found the species common throughout the summer in 1922.

Specimens, National Museum of Canada:

Waterton Lakes Park: 1 ♂, 1 ♀; August 31, 1923; Young.

Mountain Bluebird. *Sialia currucoides* (Bechstein)

Common summer resident locally. Aspen groves seem the favourite habitat. Trees with hollows for nesting seem essential, but the species is not present everywhere there are trees.

Taverner, in his traverse of the province in 1920, recorded this species near Pakowki (ten birds on August 3 and six on August 4), near Manyberries Creek (four on August 5), Elkwater Lake (one on August 6), and near Many Island Lake (four on August 7).

In the edge of the aspen forest and in clearings on the Cypress Hills, especially at higher altitudes, the mountain bluebird was common, June 30 to July 10. Some birds were still nesting, as a nest with five eggs in an old woodpecker hole 12 feet up in an old aspen stub was found, and a pair still were about a nest box at the forest ranger's station on June 30. Other birds had presumably finished nesting, as parties of four or five were not uncommon.

About the Dominion Range Station two females were seen on July 14, along a little coulée with a few stunted poplars; and a party of five, including two adult males, was seen on the badlands, July 21, 1945.

In Waterton Lakes Park, in 1922, Young recorded the species almost daily from May 16 to September 20, with the numbers recorded as seen varying usually between six and fifteen, until late August. Then there was evidently an influx of birds, for the daily record increased to twenty-five birds on August 24, and from then until September 9, the daily record was between twenty and one hundred birds; after this, the daily record dropped to between three and thirteen. In 1945, Rand and Clemens also found the species fairly common in the aspen groves in the eastern part of the park, in bands of six or so, from July 27 to August 4, after which there was some increase in numbers, forty or fifty birds were seen in a drive between the entrance of the park and Waterton Lakes township, August 6-10.

Specimens, National Museum of Canada:

Medicine Hat: 3 ♂ ad.; April 11-May 7, 1894; Spreadborough.

Nicholls Springs, Cypress Hills: 2 ♂ ad., 1 ♀ ad.; June 30-July 1, 1945; Rand and Clemens.

Milk River: 1 ♂ ad.; June 28, 1927; Soper.

Sweet Grass Hills: 1 ♀ ad.; July 7, 1927; Soper.

The adult males vary somewhat in intensity of plumage. There appears to be some geographical variation in this species; a tendency toward darkness in the adult male (notably in birds from Yukon territory, north British Columbia, Jasper (but not Lac la Nonne), and Manitoba, especially Churchill) with specimens unmatched in darkness by more southern birds; but there is so much overlap, and also so many paler birds in the northern populations, that no subspecies could be outlined in the material in the National Museum, supplemented by the collections loaned by the Royal Ontario Museum of Zoology, and by the Provincial Museum of British Columbia, a total of some one hundred and fifty-seven specimens.

Townsend Solitaire. *Myadestes townsendi* (Audubon)

Evidently not uncommon in Waterton Lakes Park throughout the summer, probably at higher altitudes, where Young recorded it occasionally from May 14 to August 26, 1922. Six on August 16 was the most recorded in one day.

Specimens, National Museum of Canada:

Waterton Lakes Park: 1 ♂ ad., 1 ♀ ad.; June 12, 1922; Young.

FAMILY—SYLVIIDAE. WARBLERS, KINGLETS, ETC.

Western Golden-crowned Kinglet. *Regulus satrapa olivaceus* Baird

Young saw a single bird on May 20, 1922, in Waterton Lakes Park.

The 1931 A.O.U. Check-list, p. 266, gives the range of *satrapa* as west to central Alberta, and is without comment as to the eastern extent of *olivaceus*. From Alberta we have the following specimens: Banff, 6; Jasper, 2; Lac la Nonne, 6. Comparing these with a long series of British Columbia specimens, and with another series from Ontario and eastward, the Alberta specimens average slightly paler dorsally than the British Columbia specimens, both in the grey of the hind neck and the olive of the back and rump, but compare much better with them in brightness of dorsal colour than they do with the quite distinct, duller, less vividly greenish olive eastern birds. From the area between Ontario and Alberta we have no material suitable for comparison. In 1944 (Can. Field-Nat., 58, p. 122), I recorded a specimen in autumn plumage from the Alaska Highway in northern British Columbia as *R. s. satrapa*. Re-examination of the skin supports the original identification. Possibly *satrapa* extends westward north of the range of *olivaceus*.

Eastern Ruby-crowned Kinglet. *Regulus calendula calendula* (Linnaeus)

Young saw only a few birds of this species in Waterton Lakes Park in 1922, between May 23 and August 13.

In 1945, Rand and Clemens saw only one there, a lone bird in the low conifers, high on Mount Crandall, on August 8.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂; May 11, 1894; Spreadborough.

Waterton Lakes Park: 2 ♂; May 27, 1922, May 28, 1923; Young.

FAMILY—MOTACILLIDAE. WAGTAILS AND PIPITS

Pipit. *Anthus spinoletta* subsp.

Though pipits are probably common on the plains during migration, and probably nest above timber-line in the Rockies, our only records are the specimens listed below.

Specimens, National Museum of Canada:

Medicine Hat: 2 ♂; April 16, 21, 1894; Spreadborough.

Waterton Lakes Park: 1 ♂; June 3, 1923; Young.

Birds in breeding plumage seem to present inconclusive evidence of geographical variation. Migrants in fresh autumn plumage from various parts of Alberta seem closer to pale *pacificus* from southern British Columbia; however, some northern British Columbia and Yukon birds are as dark as *rubescens* and would probably migrate southward into British Columbia and perhaps Alberta. The limits of variation and distribution of the two races of pipits in Canada need to be worked out.

Sprague Pipit. *Anthus spragueii* (Audubon)

On July 30, 1920, Taverner recorded three near Strathmore.

FAMILY—BOMBYCILLIDAE. WAXWINGS

Bohemian Waxwing. *Bombycilla garrula pallidiceps* Reichenow

There are two specimens in the National Museum taken at Medicine Hat, April 11, 14, 1894, by Spreadborough.

Cedar Waxwing. *Bombycilla cedrorum* Vieillot

Common in some larger tree plantations and in large stands of natural tree growth.

In the Brooks irrigation area, Rand and Clemens saw two on June 28, 1945, and were told the species was common.

Waxwings were fairly common in the aspen forests throughout the Cypress Hills, July 1-11, 1945, and a male and female taken on July 10 had enlarged gonads, indicating breeding.

The poplar groves along Milk River were also inhabited by this species, where it was seen fairly commonly July 19-21, 1945. A female taken July 21 was laying.

Young, in Waterton Lakes Park, in 1922, recorded the species occasionally throughout the summer, from June 5 when ten were seen, until September 4. In 1945, Rand and Clemens saw one on August 5, and two on August 6.

Specimens, National Museum of Canada:

Cypress Hills: 2 ♂ ad., 1 ♀ ad.; July 7, 10, 1945; Rand and Clemens.

Milk River: 1 ♀ ad.; July 21, 1945; Rand and Clemens.

FAMILY—LANIIDAE. SHRIKES

White-rumped Shrike. *Lanius ludovicianus excubitorides* Swainson

Rather uncommon; its main habitat was about sparse tree growth, on the open plains or in prairie valleys and in some of the plantations of trees.

Taverner recorded this shrike only near Medicine Hat, two birds, August 2; and near Many Island Lake, two birds, August 7, 1920.

In 1945, Rand and Clemens saw occasional birds along the prairie road between Brooks and Bassano on June 22; the species was not uncommon in the planted groves of trees about Brooks, June 23-28, and a nest containing young was seen in a spruce tree in the horticultural grounds there on June 28. The species was almost absent from the Cypress Hills, but one was seen on the southern edge of the aspen and pine forest of the reserve, July 9.

About the Dominion Range Station, young were out of the nest by July 16, 1945. In the bottom of Lost River Canyon where patches of wolf-willow and occasional poplars provided possible nesting sites, a party of five, including well-grown young, was seen July 16, four on July 18; and another band of five on July 25. The only other record here was one seen in the scrub along Milk River on July 19, 1945. The species was absent from the planted groves of trees about the ranches.

Neither Young in 1922, nor Rand and Clemens in 1945, recorded the species in Waterton Lakes Park, though a manuscript note in the National Museum gives a record for the species just north of the park, August 28, 1939, by C. H. D. Clarke.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂ ad., 1 ♀ ad.; May 17, 1894; Spreadborough.

Sweet Grass Hills: 2 ♂ ad.; July 7, 9, 1927; Soper.

Dominion Range Station: 3 immatures; July 16, 18, 1945; Rand and Clemens.

FAMILY—VIREONIDAE. VIREOS

Red-eyed Vireo. *Vireo olivaceus* (Linnaeus)

Fairly common locally; in forested areas, and occurs in some tree plantations.

There were no vireos in the higher parts of the Cypress Hills; but, on the north side, in the aspen forests at the base of the hills, red-eyed vireos were fairly common and singing, July 6-11, 1945.

In the planted groves of trees about the Dominion Range Station building, on July 18, Rand heard one singing and watched it at close range. Two vireos singing in the poplar groves along Milk River, July 19, 20, were probably this species.

Specimens, National Museum of Canada:

Cypress Hills: 3 ♂ ad.; July 6, 11, 1945; Rand and Clemens.

Eastern Warbling Vireo. *Vireo gilvus gilvus* (Vieillot)

Common in the poplar groves along Milk River, and singing, July 19-21, 1945; presumably common also along southern Saskatchewan River in similar habitat. None was found in the Cypress Hills, where the red-eyed vireo was common.

Specimens, National Museum of Canada:

Medicine Hat: 2 ♂; May 18, 22, 1894; Spreadborough.

Milk River: 1 ♀; July 21, 1945; Rand and Clemens.

Wing, ♂, 70, 71; ♀, 72 mm.

Exposed culmen, ♂, 9.5, 10; ♀, 10.7 mm.

The measurements of these specimens accord better with those of the eastern subspecies, and in colour the present series is indistinguishable from Manitoba and Ontario specimens. Taverner also has recorded a Red Deer River specimen taken August 16, as *gilvus* (1919, Auk, 36, p. 210).

Western Warbling Vireo. *Vireo gilvus swainsonii* Baird

In Waterton Lakes Park, Young recorded the species nine times during the summer, between May 22 and August 16, 1922. Two birds were the most seen on any one day. In 1945, Rand and Clemens found the warbling vireo fairly common in the low poplars along lower Pass Creek on August 4, and collected three.

Specimens, National Museum of Canada:

Waterton Lakes Park: 1 ♂, 2 ♀; August 4, 1945; Rand and Clemens.

Wing: ♂, 66 mm.; female, 66.

Exposed culmen: ♂, 9.5 mm.; female, 9.5.

Comparative measurements of males:

	Males	
	Wing	Exposed culmen
	Mm.	Mm.
<i>V. g. gilvus</i>		
Ontario.....	(4) 69-73 (av. 70.8)	(4) 10-11 (av. 10.3)
Manitoba.....	(7) 68-74 (av. 71.2)	(7) 9.5-10.5 (av. 10)
Southern Saskatchewan.....	(4) 65-72 (av. 69)	(4) 10-10.2
<i>V. g. swainsonii</i>		
Alberta:		
Lac la Nonne.....	68	9.5
Edmonton.....	(4) 66-70 (av. 68)	(4) 9-10 (av. 9.6)
Jasper.....	(5) 66-69 (av. 66.9)	(5) 9-10.5 (av. 9.6)
British Columbia:		
Southern interior.....	(5) 66-67.5 (av. 66.9)	(5) 8.7-10 (av. 9.3)
Southern coastal.....	(5) 65-67 (av. 66)	(5) 9.8-10.5 (av. 10.1)

Taverner (1928, Nat. Mus. Canada, Bull. 50, p. 100) has already recorded Lac la Nonne specimens as *swainsonii*, on the basis of their smaller bills.

Though much of the material for comparison is worn, the birds from northern and western Alberta agree better with British Columbia material in their average darker upperparts, especially the crown, than that from Manitoba and eastward. The smaller average wing length also indicates this allocation. The smaller bill size is less constant, the coastal British Columbia birds having an average larger bill than southern interior British Columbia birds, and about the same size bill as Manitoba birds.

FAMILY—PARULIDAE. WOOD WARBLERS

Rocky Mountain Orange-crowned Warbler. *Vermivora celata orestera* Oberholser

About the spruce and aspen forests in the Cypress Hills, July 1-11, 1945, this species was fairly common and well distributed. Males were singing continually and probably the species was breeding.

Specimens, National Museum of Canada:

Cypress Hills: 4 ♂ ad., 2 ♀ ad.; July 1-9, 1945; Rand and Clemens.

Medicine Hat: 1 ♂ ad.; May 10, 1894; Spreadborough.

Waterton Lakes Park: 1 ♂ ad.; May 18, 1923; Young.

Wing, males, Cypress Hills, 63, 64, 65 mm.; Medicine Hat, 61; Waterton Lakes Park, 59 mm.

The variation in the Cypress Hills males is interesting. Presumably all were breeding. One (wing very worn, 62 mm.) compares well with a series of Manitoba birds (*celata*); the other three are much more yellowish, and compare well with southern British Columbia birds (*orestera*). The population should evidently be referred to *orestera*. We also have four males from the Cypress Hills in adjacent Saskatchewan (May 21 to June 16), they measure: wing 62, 62, 64, 64 mm.; two in colour agree with average *orestera* from southern British Columbia and two agree better with the richest coloured *celata* from Manitoba. These too are best referred to *orestera*.

Surveying the variation of this species in Alberta, there is a decrease in size northward, and an average decrease in the yellowness of the plumage.

Measurements (in mm.) of males are as follows:

Cypress Hills (July): 63, 64, 65.

Medicine Hat (May 10): 61.

Waterton Lakes Park (May 18): 59.

Red Deer River (June 30-July 20): 59, 61.

Canmore (May 27): 64.

Banff (May 23): 61, 62, 63.

Jasper (June 28): 60.

Edmonton (May 5-June 28): 61, 62, 63.

Lac la Nonne (May 26): 62.

Wood Buffalo Park (May 22, 23): 59, 60.

The northward decrease in size is supported by a Mackenzie Delta male, wing 59 mm.

In colour, the Cypress Hills, Banff, Canmore, and Edmonton birds average close to southern British Columbia *orestera*; the Waterton Lakes Park, the Medicine Hat, the Red Deer River, the Lac la Nonne, and Wood

Buffalo Park specimens average closer to *Manitoba celata*. Judging from the variation in the breeding Cypress Hills series, it is inadvisable to identify individuals, but rather average the characters from geographical areas and assign the populations to subspecies on the basis of these averages, though it is possible some of these paler birds are migratory *celata*.

The outlines of the breeding ranges on available material are as follows.

Vermivora celata celata. From Manitoba to northern Alberta (south to Wood Buffalo Park and Lac la Nonne) and Yukon (Canol Road), north to Mackenzie Delta.

Vermivora celata orestera. British Columbia east of the Coast Range, from Rossland (♂, June 7) to southwestern Yukon (♂, Burwash Landing, July 6) and southern Alberta (locally), north to Jasper and Edmonton, and east to southwestern Saskatchewan (Cypress Hills).

Probably both subspecies occur southward throughout southern Alberta in migration. Separating the Alberta birds in the National Museum, in fresh autumn plumage into two series; a yellower one comparing well with autumn *orestera* from southern British Columbia; and a greyer one comparing better with *Manitoba celata*, gives the following:

V. c. orestera

Jasper, 3, August 19-September 6.
Red Deer River, 1, August 28.
Kirriemuir, 1, September 11.
Lac la Nonne, 1, August 25.

V. c. celata

Red Deer River, 4, August 24-September 5.
Rosebud, 1, September 8.
Lac la Nonne, 5, September 4-20.
Wood Buffalo Park, 2, September 7, 9.

Eastern Yellow Warbler. *Dendroica petechia aestiva* (Gmelin)

Common locally in shrubbery and tree growth of the plains of the southeastern part of the province.

Taverner, in 1920, saw the yellow warbler only near Manyberries Creek and near Elkwater Lake, August 5, 6.

About the plantation of trees of the Brooks area the species was fairly common in late June 1945. At lower altitudes in the Cypress Hills it was also common and inhabited the clumps of shrubbery (rose bushes and bilberry) and the aspen stands of the lower edge of the forest slopes, July 5-11.

The groves of trees and shrubbery that had been planted about the Dominion Range Station held very few species of birds, but a few yellow warblers had taken up their residence there. In the natural shrubbery along Milk River to the south, the yellow warbler was common, but was absent from the scattered shrubbery of wolf-willow, rose bushes, and other bushes in the coulées of the plains, July 19-21, 1945.

Specimens, National Museum of Canada:

Medicine Hat: 3 ♂ ad.; May 14-24, 1894; Spreadborough.
Cypress Hills: 3 ♂ ad.; July 9, 11, 1945; Rand and Clemens.
Milk River: 1 ♂ ad.; July 21, 1945; Rand and Clemens.
Wing, ♂, (6) 62-65 (av. 63.3 mm.).

These are bright yellowish olive-backed birds with the forepart of the top of the head yellow. This brightly coloured form breeds as far north as Red Deer River at least.

Northern Yellow Warbler. *Dendroica petechia amnicola* Batchelder

Probably migrates throughout, and probably the breeding form of the Rocky Mountains of the southwestern part of the province.

In Waterton Lakes Park, Young recorded the yellow warbler occasionally from May 23 to September 4, 1922. Rand and Clemens saw the species only once, a male and a female in the willow shrubbery along the chief Mountain Highway.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂ ad.; May 21, 1894; Spreadborough.
Wing, 61 mm.

Unfortunately, we have no specimens from the Waterton Lakes Park, but as this race, characterized by being duller, more olive, less yellowish above, and with the yellowish area on the head less distinct, is the breeding form as far south as Lac la Nonne (two males, May 24, 26), and in the mountains of the west as far south as Jasper (three males, June 17 to August 2), and Banff and Canmore (eight males, May 16 to June 19), it is probable that it also extends southward to Waterton, though specimens are needed to demonstrate this.

Alaska Myrtle Warbler. *Dendroica coronata hooveri* McGregor

Apparently only a migrant in southern Alberta; Young saw none in his summer in Waterton Lakes Park; nor did Rand and Clemens find the species. Spreadborough collected a series of adults (4 ♂ and 1 ♀) at Medicine Hat, April 30 to May 18, 1894, presumably on spring migration. Their wing measurements are: ♂, 74, 76.5, 77, 78; ♀ 73.5.

Oberholser (1938, State of Louisiana, Dept. Conservation, Bull. 28, pp. 537, 538) has pointed out that *hooveri* is characterized by being larger; in having a more solidly black breast in the male; and, in the winter plumage and in the young plumage, the upperparts being less rufescent, compared with eastern birds.

Measurements of specimens in the National Museum are as follows:

	♂ Adult	♀ Adult
	Mm.	Mm.
Alaska.....	76, 77, 78.5	72, 74, 74
Yukon.....	(7) 73-77 (75)	.....
Mackenzie.....	76	72.5, 73.5
British Columbia.....	74, 79, 79	70
Alberta.....	(9) 70-79 (75.2)	69.5, 70, 73.5
Saskatchewan.....	75, 75, 79	.....
Manitoba (north ¹).....	73, 73, 75, 76	67, 68, 68
Manitoba (south ²).....	69, 71.5, 72, 75, 75	68, 70
Ontario.....	(18) 71-78 (73.6)	(9) 65-72 (69.7)
Quebec (north shore of Gulf of St. Lawrence) ..	72, 74, 74, 75	69, 70, 71
New Brunswick.....	71, 72, 72	69
Nova Scotia.....	73, 74, 75	71

¹ Clear Lake and northward.

² South of Clear Lake.

The postulated, more solid black breast in the male is not apparent in our material, and I am unable to detect any differences in this between Alaska and Yukon birds, compared with Quebec and Maritime Provinces specimens.

In the more rusty colour of the upperparts of autumn specimens, those from Ontario eastward average somewhat more rusty, compared with specimens from Alberta westward; though occasional specimens from as far west as Alberta and southern Mackenzie are not distinguishable on this character. Manitoba specimens average small, and the autumn specimens are less rufous, indicating an area of intergradation. The Saskatchewan material available is all adult, and on size is referred to the western race.

On the basis of material in the National Museum, it appears that *D. c. hooveri* is lightly marked but a recognizable race, characterized by its slightly larger size, and in the autumn plumage by its less rusty upperparts, but intergrading with *D. c. coronata* through individual variation.

The most southern breeding localities in the province in the east seem to be the Battle River area (Farley, 1932, Birds of the Battle River Region, p. 52); in the west, south to Banff (Clarke and Cowan, 1945, Can. Field-Nat., 59, p. 99). This species seems to replace *D. auduboni* geographically, and where their ranges meet, hybridization has been suggested a number of times.

Pacific Audubon Warbler. *Dendroica auduboni auduboni* (Townsend)

Common summer resident, probably breeding, in the coniferous forests of the Cypress Hills, and the forests of the Rocky Mountains.

In the Cypress Hills this species was generally distributed in the stands of pine, mixed conifers and aspens, and in some aspen stands with only a few scattered spruces. During our stay, July 1-11, 1945, the males were singing, usually in the upper third of the taller trees; and those collected had enlarged gonads, indicating breeding.

In Waterton Lakes Park, Young found the species very common throughout the summer, recording it from May 17 to September 20, 1922. Rand and Clemens, in 1945, saw individuals throughout from the poplar flats at lake-level to the coniferous forests of Akamina Pass, July 28 to August 8.

Specimens, National Museum of Canada:

Cypress Hills: 2 ♂ ad., 1 ♀ ad.; July 1-9, 1945; Rand and Clemens.

Waterton Lakes Park: 1 ♂ ad., 1 ♀; May 17, 1922, August 2, 1945; Young, Rand, and Clemens.

Wing, ♂ ad., 76, 78, 80 mm.

Townsend Warbler. *Dendroica townsendi* (Townsend)

Recorded only in the Rocky Mountains of the west.

In Waterton Lakes Park, Young recorded one on May 22, 1922, and a manuscript note in the files of the National Museum records observations of this species on August 26, 27, 1939, by C. H. D. Clarke.

We have no specimens from southern Alberta, the nearest locality represented being Banff: one male, August 16, 1945, by Rand and Clemens.

Black-throated Green Warbler. *Dendroica virens virens* (Gmelin)

Probably throughout in migration.

We have three records: Young recorded sight identifications in Waterton Lakes Park on May 22 and May 27, 1922; and we have a Spreadborough specimen taken May 18, 1894, at Medicine Hat. It is an adult male in full plumage.

Bay-breasted Warbler. *Dendroica castanea* (Wilson)

Our only record is a specimen taken by Spreadborough at Medicine Hat, May 17, 1894. It is an adult male in full plumage.

Black-poll Warbler. *Dendroica striata* (Forster)

Probably a migrant throughout, though our only records are the specimens listed as follows:

Medicine Hat: 5 ♂ ad., 1 ♀ ad.; May 10-19, 1894; Spreadborough.

Oven-bird. *Seiurus aurocapillus* subsp.

Fairly common in the aspen forests of the lower slopes of the Cypress Hills where many were heard singing, July 7-11, 1945.

Specimens, National Museum of Canada:

Cypress Hills: 2 ♂ ad., 1 ♀ ad.; July 9, 11, 1945; Rand and Clemens.

These specimens are very worn, and as such are not comparable with most of our other material. But compared with three Ontario birds of similar date and comparable state of wear, they are much greyer green, less olive-green, above.

They compare well with the description of *S. a. cinereus* Miller from Montana, and are perhaps referable to that race, but I have seen no *cinereus*, and before admitting that race to the Canadian list it is advisable to make actual comparison.

Grinnell Water-thrush. *Seiurus noveboracensis notabilis* Ridgway

Recorded only in Waterton Lakes Park, where the specimens collected give our only records.

Specimens, National Museum of Canada:

Waterton Lakes Park: 2 ♂, 2 ♀; June 19-July 6, 1923; 1 ♂, August 7, 1945; Young, Rand, and Clemens.

Three of the specimens were taken in July, and are very worn; the June 19 bird has little yellow below, as does the August bird, and compared with similarly plumaged New Brunswick and Nova Scotia birds (*noveboracensis*) they have the back darker, less olive. Compared with British Columbia specimens from Vanderhoof (*limnaeus*) they are not as dark and are less sooty above.

Macgillivray Warbler. *Oporonis tolmiei* (Townsend)

Common locally in deciduous shrubbery in proximity to coniferous and aspen forest; hence very local in southern Alberta.

In the damp, bushy areas of willow and alders on the forest edge, throughout the Cypress Hills, Macgillivray warbler was a common species, July 1-11. The species was apparently nesting as the males were singing from the same stations day after day.

At Waterton Lakes Park, Young recorded the species as common May 25 to July 26, 1922. In 1945, it was common August 4-6 in the tangled swamps and streamside thickets at low altitudes.

Specimens, National Museum of Canada:

Cypress Hills: 2 ♂ ad., 1 ♀ ad.; July 5, 6, 1945; Rand and Clemens.
Waterton Lakes Park: 2 ♂ ad.; May 25, 30, 1922; Young.

The measurements of the above males, and of some comparative specimens (males) are as follows:

	Wing	Tail	Difference
	Mm.	Mm.	Mm.
Coastal southern British Columbia	(8) 58-65 (av. 61.2)	(7) 51-57 (av. 53.8)	7.4
Waterton Lakes Park.....	60, 62	55, 55	6.0
Cypress Hills, Alta.....	60, 63	54	7.5
Cypress Lake, Sask.....	(5) 60-61 (av. 60.6)	(4) 51-57 (av. 54.5)	6.1

Phillips has recently described several new races of this species (1947, Auk, 64, pp. 296-300). Three races are given as ranging in Canada: *O. t. tolmiei*, southwestern British Columbia; *O. t. intermedia*, from northern British Columbia southward; and *O. t. austinsmithi*, southeastern British Columbia to southwestern Saskatchewan.

The described differences are of colour, *austinsmithi* being darker and greyer green above and paler, greener yellow below than *tolmiei*. *Intermedia* is described as intermediate. Comparing a series of eight males from coastal southern British Columbia with eleven males from the Cypress Hills area of Alberta and Saskatchewan, the latter birds may average very slightly duller above, and less bright yellow below, but the difference is so slight as to be unsatisfactory in separating series. To recognize an intermediate race covering, in Canada, a larger range than either of the others is impossible. It seems inadvisable to recognize by name the very slight tendency toward differentiation shown by this species in Canada.

Western Yellow-throat. *Geothlypis trichas occidentalis* Brewster

Common in reedy and shrubby habitat, near water, natural or artificial, out on the plains or in proximity to forest.

Taverner recorded one near Elkwater Lake, August 6, 1920.

In the rose bushes and reeds about Elkwater Lake, and in various places along the edge of the Cypress Hills where streams or ponds were fringed with either reeds or rose bushes, the yellow-throat was fairly common, singing, July 9-13, 1945. At the Dominion Range Station the species was found occasionally in small clumps of low willow and rose-bush shrubbery along irrigation projects on the plains in mid-July. Along Milk River the species was very common in the dense shrubbery, and was sometimes seen well up in the poplar trees. By July 24, 1945, a family party of young, out of the nest, was seen.

In Waterton Lakes Park, Young recorded only two individuals in 1922, on August 5. In 1945, Rand and Clemens recorded only two August 6, 8, in the damp tangled shrubbery that seemed such a suitable habitat. The male seen on August 8 was still singing.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂ ad.; May 14, 1894; Spreadborough.
 Cypress Hills: 2 ♂ ad., 2 ♀ ad.; July 9-11, 1945; Rand and Clemens.
 Milk River: 2 ♂ ad., 1 ♂ imm.; July 19-24, 1945; Rand and Clemens.
 Deer Creek, Milk River: 1 ♂ ad.; July 13, 1927; Soper.

Long-tailed Chat. *Icteria virens auricollis* (Lichtenstein)

Common in the dense shrubbery along Milk River, south of the Dominion Range Station, July 19-24, 1945, where the males were very noisy and conspicuous, though shy. The males were singing from the tops of the poplars, and on our approach flew down into the dense, prickly shrubbery that formed a narrow band of cover along the river, where it was very difficult to see or collect them although they kept up a variety of calls. That they were common was indicated by our rarely being out of hearing of at least one of these birds as we worked along a mile or so of the river. We estimated three or four pairs to a quarter mile. On July 24, one bird was seen carrying food, probably to its young.

Though recorded a number of times for southern Saskatchewan (Soper, 1942, Can. Field-Nat., 56, pp. 83-85), the species seems not to have been recorded for Alberta.

Specimens, National Museum of Canada:

Milk River: 3 ♂ ad.; July 20, 24, 1945, Rand and Clemens.
 Wing, 78, 80, 82; tail, 77, 84, 85 mm.

In their larger size, greyer back, and more extensive white in the malar area they compare better with southern British Columbia specimens than with eastern birds.

Wilson Warbler. *Wilsonia pusilla pusilla* (Wilson)

Probably a regular spring and autumn migrant in southern Alberta.

Specimen, National Museum of Canada:

Medicine Hat: 1 ♂ ad.; May 14, 1894; Spreadborough.
 Wing, 57 mm.

In dull coloration this specimen compares better with eastern examples than with central British Columbia and Yukon specimens.

Northern Pileolated Warbler. *Wilsonia pusilla pileolata* (Pallas)

Though this species is a common summer visitant in the Banff area (Clarke and Cowan, 1945, Can. Field-Nat., 59, p. 100), it appears to be rare in Waterton Lakes Park. Young recorded one on June 1, 1922, and collected a male on July 12. In 1945, Rand and Clemens collected a specimen on August 3.

Specimens, National Museum of Canada:

Waterton Lakes Park: 1 ♂ ad., 1 sex ? imm.; July 12, 1922, August 3, 1945;
 Young; Rand, and Clemens.
 Wing, ♂, 58 mm.

These specimens are somewhat brighter coloured than eastern specimens, and compare better with Banff, Jasper, and Yukon specimens, though not so bright as many of them.

American Redstart. *Setophaga ruticilla* (Linnaeus)

Fairly common locally as a summer resident in aspen forests; probably migrates throughout.

In the Cypress Hills, Taverner, in 1920, saw one near Elkwater Lake on August 6. In 1945, Rand and Clemens found the species fairly common, and singing in the aspen forest on the lower slopes of the Cypress Hills in early July, and shot a male in breeding condition on July 7.

In Waterton Lakes Park, Young did not record the species in 1922; but Clarke saw one near the townsite on August 27, 1939; and Rand and Clemens saw one male in aspen forest below the lakes on August 4, 1945.

Specimens, National Museum of Canada:

Medicine Hat: 2 ♂ ad.; May 18, 21, 1894; Spreadborough.
Cypress Hills, 1 ♂ ad.; July 7, 1945; Rand and Clemens.
Deer Creek Ranch, Milk River: 1 ♀; August 13, 1934; Russel.
Wing, ♂, 62, 63, 64; ♀, 62 mm.

FAMILY—PLOCEIDAE. WEAVER FINCHES

English Sparrow. *Passer domesticus domesticus* (Linnaeus)

Common in 1945 in the settlements on the plains and about the forest edge, even in such isolated establishments far out on the plains as the Dominion Range Station, where a few had established themselves. They were common about the establishments on the edge of the Cypress Hills, and plentiful in Waterton Lakes Park townsite.

Neither Taverner in 1920, in his traverse of the plains, nor Young in 1922, in Waterton Lakes Park, mention this species.

FAMILY—ICTERIDAE. MEADOW LARKS, BLACKBIRDS, ETC.

Bobolink. *Dolichonyx oryzivorus* (Linnaeus)

Evidently a scarce and probably local summer bird. Taverner in 1920, Young in 1922, and Rand and Clemens in 1945, did not record the species. The following specimens are our only data.

Specimens, National Museum of Canada:

Waterton Lakes Park: 1 ♂ ad.; June 25, 1923; Young.
Deer Creek, Milk River: 1 ♂ ad.; July 13, 1927; Soper.
Male: wing, 197, 200; tail, 65, 67; exposed culmen, 14, 14.5 mm.

Western Meadowlark. *Sturnella neglecta* Audubon

Though a common bird locally of open country throughout the area the meadowlark is far from being of universal distribution. Few were seen on the open short-grass plains, and there it was practically absent from large areas. But where the grass was denser, in hollows, about lower, damper ground, or where grass and shrubs provided ground cover, the species was common, June to August.

Specifically in 1945, the species was fairly common in the Brooks area, June 25-28; in the country surrounding the Cypress Hills, and even onto the shrubby benches on top of the hills, June 30 to July 11. About more densely grassed places around the Dominion Range Station, the species was common, and very common in some of the valley bottoms where denser grass and shrubbery occurred, such as the wolf-willow flats of Lost River,

and the valley bottom of Milk River, July 14-24. At Waterton Lakes Park, though there seemed much suitable habitat, the species was rather scarce, August 4-10.

Taverner, in his traverse of the province in early August, 1920, recorded six to one hundred daily; Young, in 1922, in Waterton Lakes Park, recorded the species only occasionally from May 18 to September 1, ten on August 6 being the most recorded any one day.

Specimens, National Museum of Canada:

Cassils (near Brooks): 1 ad.; June 25, 1945; Rand and Clemens.

Medicine Hat: 2 ♂; April 13, 19, 1894; Spreadborough.

Milk River (near Dominion Range Station): 2 ad., 1 imm.; July 14-18, 1945; Rand and Clemens.

Milk River, longitude 112° 25': 1 ♂ ad., 1 imm.; June 23, 27, 1927; Soper.

The earliest record of young on the wing is the June 27, 1927, specimen.

Yellow-headed Blackbird. *Xanthocephalus xanthocephalus* (Bonaparte)

Common, but very local due to the scarcity of suitable, larger marshes for their nesting.

In 1945, on a lake near Cassils in the Brooks area, we saw twenty to thirty daily in late June, and young were already on the wing by June 25. Unlike the red-wings at this time, the yellow-headed blackbirds were usually in small flocks of four or five birds, usually males or females, and as well as feeding along the lake shore they were often seen a quarter of a mile or more from the water, walking about on the greener, more grassy parts of the prairie.

At Elkwater Lake, on the north edge of the Cypress Hills, there appeared to be several small colonies (parties of four or five birds seen) on the north and west sides of the lake.

Taverner reported seeing two birds near Pakowki Lake on August 5, 1920.

In Waterton Lakes Park, Young reported seeing two on September 8, 1922.

Specimens, National Museum of Canada:

Cassils: 1 ♂ ad., 1 ♂ fledgling; June 24, 1945; Rand and Clemens.

Wing, ♂ ad., 142 mm.

Giant Red-wing. *Agelaius phoeniceus arctolegus* Oberholser

A common nesting species in the marshes, large and small, bordering standing water on the prairies. This naturally gives it a very scattered, local distribution, but much more widespread than that of the yellow-headed blackbird.

In the lakes near Cassils, just west of Brooks, June 27-28, the species was fairly common in the marshes along the edges of the ponds, and though young were already out of the nest, no flocking had commenced. About the edges of the Cypress Hills, red-wings were apparently nesting in several small marshes as well as about Elkwater Lake; a few were found near the Dominion Range Station, on the plains, apparently breeding in the tall vegetation in the areas of impounded water, July 14-24. Though a nest with one egg, one pipped egg, and two small young was found on July 18,

flocks of birds had already begun to assemble by that date, and such flocks of ten to twenty birds, composed of adult males, females, and immatures, were seen feeding in the wolf-willow flats of Lost River, some distance from water; and flocks were coming at dusk to roost in the tall vegetation about the artificial ponds.

In Waterton Lakes Park, Young, in 1922, recorded the species occasionally from May 16 to August 5; in 1945, Rand and Clemens saw a few about the marshes on the edge of the plains on the eastern edge of the park, July 31 to August 10.

Specimens, National Museum of Canada:

Cassils: 2 ♂ ad.; 1 ♂ fledgling; June 24, 1945; Rand and Clemens.

Cypress Hills: 1 ♂ ad.; July 6, 1945; Rand and Clemens.

Milk River: 1 ♂ ad., 1 ♀ imm.; July 21, 23, 1945; Rand and Clemens.

Deer Creek, Milk River: 1 ♂ ad.; July 18, 1927; Soper.

Waterton Lakes Park: 1 ♂; June 18, 1922; Young.

Wing, 125, 126, 128, 129, 130 mm.

Taverner has attempted to show that *arctolegus* is a non-recognizable race, despite there being a slight tendency toward increased size in north-west interior Canada (1939, Condor, 41, pp. 244-246). However, Taverner sets up no criterion as to a necessary difference between subspecies. Adopting the current concept that 75 per cent of one subspecies be separable from 75 per cent of another subspecies, it is seen by an examination of the data presented on wing length by Taverner (p. 245) that his measurements meet the requirements of this concept, and *arctolegus* is recognizable.

Baltimore Oriole. *Icterus galbula* (Linnaeus)

Recorded definitely only in the big poplars lining Milk River, south of the Dominion Range Station, where one or two birds were seen each time the area was visited, July 19-24. Though conspicuous as they flew or sang high up in the big trees, they were very shy, and one was collected only with difficulty. It is a male, in full plumage, and appears identical with eastern specimens.

Bullock Oriole. *Icterus bullockii bullockii* (Swainson)

The following specimens are our only records.

Medicine Hat: 4 ♂ ad.; May 22-26, 1894; Spreadborough.

Wing, 100, 101, 103, 104 mm.

These specimens are somewhat paler, more yellowish and less orange below, especially on the breast and side of the head, than seven specimens from southern British Columbia. They show no tendency toward hybridization with *galbula*.

Brewer Blackbird. *Euphagus cyanocephalus* (Wagler)

A local summer resident on the plains where there are irrigation projects giving water, and trees, and about the edges of the forests.

Taverner, in 1920, recorded the species near Pakowki Lake, August 4, when he saw four; and near Medicine Hat, on August 7, when he saw fifteen.

In 1945, it was common about the irrigated areas around Brooks, in late June; fairly common about the margins of the forest of the Cypress Hills, July 1-10, when they were still singly or in pairs. About the

Dominion Range Station a small number were seen near the irrigation projects, but on July 18 the first flock of the season was seen. This consisted of eight birds, and was in the wolf-willow flats of Lost River Valley, some distance from water.

In Waterton Lakes Park, Young recorded one or two of this species almost daily from May 13-27, but after that only on the following dates: June 23 (ten seen); July 3 (twenty seen); August 5 (fifty seen); August 12 and 18 (twenty-five seen); and September 8 (one hundred seen).

Specimens, National Museum of Canada:

Medicine Hat: 2 ♂ ad., 2 ♀ ad.; May 4-25, 1894; Spreadborough.

Milk River: 1 ♂ ad., 3 ♀ ad.; June 25-July 19, 1927; Soper.

Cypress Hills: 1 ♂ ad.; July 10, 1945; Rand and Clemens.

Waterton Lakes Park: 1 ♂ ad.; June 8, 1923; Young.

Wing, ♂ ad., 129, 130, 130, 135; ♀ ad., 118, 120, 122 mm.

Bronzed Grackle. *Quiscalis versicolor* Vieillot

Apparently of not uncommon summer occurrence where there is abundant, well-watered tree growth; thus its occurrence in southern Alberta is very local.

In the town of Brooks four or five were seen on June 28, 1945. In the Cypress Hills a flock of about a dozen came about the forest preserve headquarters on July 7, 1945, and to the cattle trough for water. Most of these appeared to be full-grown young. Another flock of about fifteen was seen feeding on the open prairie on July 9, and July 13, just south of the Cypress Hills.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂ ad.; April 27, 1894; Spreadborough.

Wing, 146; tail, 134; exposed culmen, 32 mm.

Nevada Cowbird. *Molothrus ater artemisiae* Grinnell

Taverner in his traverse of the southern plains in early August 1920, saw from one to six cowbirds almost daily.

About Cassils in the Brooks area, cowbirds appeared only fairly common, June 22-29, 1945; more especially about groves of planted trees, but they also wandered widely over the prairie, often in parties of four to six males, sometimes with a female or two with them.

In the Cypress Hills area the species was not common. A fledgling was taken on July 7, but the species was not seen again until July 10, when a flock of ten was seen, and several scattered individuals, about cattle on the north edge of the reserve. A female taken on this day had an egg in its oviduct, ready to lay.

Few cowbirds were seen in the Dominion Range Station area. From July 18-21, single birds or flocks of up to ten or sixteen birds were seen occasionally, in the trees along Milk River; in the wolf-willow flats of Lost River Valley, or on the prairie in the company of cattle.

In Waterton Lakes Park, Young, in 1922, recorded the species almost daily from May 15 to August 12, after which only one was seen, on August 19. The numbers seen per day in May were four to ten birds; in June, usually twenty or twenty-five, but one hundred birds on June 23; in July, two to six birds; and in August one to twenty birds.

Rand and Clemens found the species fairly common in the eastern edge of the park on the edge of the plains, July 28 to August 10, 1945.

Specimens, National Museum of Canada:

Cassils: 1 ♂ ad.; June 26, 1945; Rand and Clemens.

Medicine Hat: 1 ♂ ad., 1 ♀ ad.; May 14, 15, 1894; Spreadborough.

Cypress Hills: 1 ♂ ad., 1 ♀ ad., 1 fledgling; July 7-10, 1945; Rand and Clemens.

Dominion Range Station area: 1 ♂ ad., 2 ♀ ad., 1 ♂ imm.; July 18-21; Rand and Clemens.

Waterton Lakes Park: 2 ♂ ad., 1 ♀ ad.; May 17-July 5, 1922 and 1923; Young.

Waterton Lakes Park: 1 ♂ imm.; July 28, 1945; Rand and Clemens.

Wing, 111, 112, 112, 113, 114, 116 mm.

The wings of six Ontario males are as follows: 107, 108, 109, 110, 110, 112 mm.

FAMILY—THRAUPIDAE. TANAGERS

Western Tanager. *Piranga ludoviciana* (Wilson)

Recorded only in Waterton Lakes Park where Young, in 1922, recorded one or two birds on each of 5 days between May 15 and July 11. In 1945, Rand and Clemens recorded individuals on five occasions, July 27 to August 7. All were on the lower edge of the forest, where it joins the intruding grasslands of the plains.

Specimens, National Museum of Canada:

Waterton Lakes Park: 1 ♂ ad., 1 ♀ ad.; July 11, 1922, Young; and August 7, 1945; Rand and Clemens.

FAMILY—FRINGILLIDAE. GROSBEAKS, FINCHES, SPARROWS, ETC.

Rose-breasted Grosbeak. *Pheucticus ludovicianus* (Linnaeus)

Our only records are the following specimens:

Medicine Hat: 3 ♀; May 17, 1894; Spreadborough.

Wing, 100, 103, 104; tail, 72, 76, 77; exposed culmen, 16, 16, 17 mm.

One specimen has rose-coloured underwing coverts; the other two have yellow, rose-tinged underwing coverts.

Lazuli Bunting. *Passerina amoena* (Say)

In the dense, high, prickly shrubbery bordering Milk River, south of the Dominion Range Station, two adult males were seen on July 21, 1945. Young, in 1922, recorded the species on June 3 (one bird) and July 6 (two birds) in Waterton Lakes Park.

Specimens, National Museum of Canada:

Milk River: 1 ♂ ad.; July 21, 1945; Rand and Clemens.

Waterton Lakes Park: 1 ♂ ad.; June 3, 1922; Young.

Wing, 71, 74; exposed culmen, 10 mm.

Cassin Purple Finch. *Carpodacus cassinii* Baird

Apparently fairly common in extreme southwestern Alberta in the Rocky Mountains in Waterton Lakes Park.

Young, in 1922, recorded the species in Waterton Lakes Park in May, thirty being recorded on May 15 and 16, and others occasionally until the

end of May. The next year he collected specimens on June 6. In 1945, on July 31, Rand and Clemens shot two birds in the low pines near timber-line above Akamina Pass.

Specimens, National Museum of Canada:

Waterton Lakes Park: 3 ♂ ad.; 1 ♀ ad.; June 6, 1923, and July 30, 1945;
Young, Rand, and Clemens.
Wing, ♂ ad., 93, 95 mm.

These specimens agree well with southern British Columbia material. This appears to be an extension of range of the species, hitherto unrecorded for Alberta.

Duval (1945, Condor, 47, p. 203) has proposed *C. c. vinifer* for the Cassin purple finches of Washington and British Columbia, but I have no material for deciding on the validity of this race.

Grey-crowned Rosy Finch. *Leucosticte tephrocotis tephrocotis* (Swainson)

Young found this species in Waterton Lakes Park in 1922 and 1923. In 1922, he saw flocks of forty and fifty on May 27 and 29, and noted the species in small numbers in late June and on July 24. He collected a series of adults, five males and one female, May 14-29, 1923.

Common Redpoll. *Acanthis flammea flammea* (Linnaeus)

Probably a common migrant; we have only the two specimens taken, probably in spring migration.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂, 1 ♀ (?); April 7, 1894; Spreadborough.
Wing, ♂, 74, ♀ (?), 73; culmen, from feathers at base, ♂ 8, ♀ 8 mm.

Northern Pine Siskin. *Spinus pinus pinus* (Wilson)

Common in coniferous forest areas.

In the pine forests on the Cypress Hills, July 3-5, 1945, siskin were seen. One was collected, a female, with enlarged ovary, evidently breeding.

In Waterton Lakes Park, Young recorded the species occasionally from May 15 to September 20, 1922, most commonly in August and September when ten to twenty birds were often seen in a day; on the last day, September 20, fifty birds were recorded. Rand and Clemens, August 1-10, 1945, found the species fairly common there.

It ranged from the shrubbery at low altitudes on the edge of the plains to alpine grassland, far above timber-line. In the alplands the birds were in flocks, feeding on the turf, apparently on the seeds of tiny alpine plants.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂; May 21, 1894; Spreadborough.
Cypress Hills: 1 ♀; July 3, 1945; Rand and Clemens.
Waterton Lakes Park: 1 ♂; June 9, 1923; Young.
1 ♂, 1 sex?; August 9, 10, 1945; Rand and Clemens.

Aldrich (1946, Proc. Biol. Soc. Wash., 59, p. 133) has described a western subspecies as *S. p. vagrans* and characterized it as paler above, and with less streaking. Examining the series of about one hundred and twenty skins in the National Museum, representing localities from western British Columbia to Nova Scotia, I am unable to separate the series so as

to fall into two geographical groups, separable on colour. Wear changes the colour of the plumage considerably, and comparable plumages must be used. Many series differ from others, sometimes considerably, but in attempting to combine them into a pattern, the result is confusion. For example, a series of winter birds from central southern British Columbia is considerably paler brown above than a comparable Ontario series, and a Nova Scotia series is intermediate; of fresh-plumaged autumn birds, two from Vancouver Island are darker, richer brown, and more heavily streaked than most Ontario specimens, whereas three Nova Scotia birds, in like plumage, include a very dark and a very light specimen. Allowing for variability, there is a tendency for Alberta and south British Columbia worn specimens to be slightly paler than those from Ontario, but there is very slight average difference. On the basis of our Canadian-taken material, though it is possible to sort specimens as individuals into two series, a paler and a less streaked, and a darker and a more streaked one, to separate the two series as subspecies would necessitate postulating a remarkable amount of wandering that hardly seems justifiable.

Pale Goldfinch. *Spinus tristis pallidus* Mearns

A common species about forest edges; planted groves of trees, and natural brush in coulées and valleys in the plains.

Several were seen in the planted tree groves about Brooks, June 22-28, 1945.

In the Cypress Hills area goldfinches were common in the shrubbery surrounding the hills, July 5-11.

The goldfinch was the only bird attracted commonly to the tree plantations of the Dominion Range Station, where it was common and singing, July 13-24. It was also common in the trees and shrubbery along Milk River, and was seen there coming to drink from the edge of the river. Taverner, in 1920, recorded five of these birds between Pakowki Lake and Elkwater Lake, August 5-6.

In Waterton Lakes Park, Young recorded the species very occasionally from June 29 to September 4, 1922, two birds being the most seen in any one day. In 1945, Rand and Clemens saw several August 4, 6, in the aspen and poplar forest, and in weedy fields at low altitudes near the eastern edge of the park.

Specimens, National Museum of Canada:

Milk River: 1 ♂ ad., 1 ♀ ad.; July 21, 24, 1945; Rand and Clemens.

Waterton Lakes Park: 2 ♂ ad., 2 ♀ ad., June 29, 1922, June 14, 19, 1923; Young.

Wing, ♂, 72, 72, 74; ♀ 69, 70, 70 mm.

Bendire Red Crossbill. *Loxia curvirostra bendirei* Ridgway

This species was found in the lodge-pole pine forest above Elkwater in the Cypress Hills, June 30 to July 5, 1945. They were fairly common in flocks of up to twenty individuals. They were seen feeding on the cones of the pines, and specimens collected had pine seeds in their gullets. The specimens collected were: three males, largely in red plumage, mixed with some yellow; one male in yellow plumage mixed with some red; one

immature largely in the streaked plumage but with a few orange-red feathers; one female adult and two full-grown, streaked-plumaged immature females.

Measurements: male, wing, 89, 90, 91, 94, 97; culmen, 15, 16, 16.5, 16.5, 17; depth of bill at base, 10-10.8; female, wing, 88, 90, 94; culmen, 16, 16, 16.5; depth of bill at base, 10-10.2 mm.

Though the males had enlarged gonads they were moulting their wings, as was the female, and that and the well-grown condition of the immatures, indicates they may not have been on their breeding grounds.

Griscom (1937, Proc. Boston Soc. Nat. Hist., 41, No. 5, pp. 77-210), has treated the red crossbills monographically. Apparently there is not a single breeding record for the province of Alberta. *L. c. sitkensis*, presumably a migrant from the Pacific coast, has been recorded a number of times in Alberta, and *minor* has been assigned to the northern part of the province on the basis of a specimen collected at Fort Smith, which is in the Northwest Territories on the Alberta border. The race *bendirei*, known from southern British Columbia, has hitherto been unrecorded in Alberta. There is one specimen from the Cypress Hills, Saskatchewan, which was the reason for Griscom including the Cypress Hills in the range of *benti*.

With the notably erratic movements of the red crossbill, it would seem that any one of the four races mentioned above might reach the Cypress Hills.

In size the present series compares well with *bendirei* from south British Columbia. *L. c. benti* is larger, with a larger bill. In colour one of the three red males is scarlet, much like certain south British Columbia *bendirei*; the two others are more rose, with the grey of the underparts paler and purer grey; and the adult female has the grey of the underparts paler, and, especially on the throat, more extensive, showing an approach toward the colour as described for *benti*. Thus, on size the present series is referred to *bendirei*, with a tendency in colour toward *benti*.

Special efforts should be directed toward collecting red crossbills in Alberta every year they occur, and of breeding birds, with a view to discovering the birds of normal occurrence in the province.

That some form of crossbill occurs in Waterton Lakes Park is evident from records of two seen on September 2, 1922, by Young.

White-winged Crossbill. *Loxia leucoptera leucoptera* Gmelin

Our only record for southern Alberta is a female collected in Waterton Lakes Park on September 3, 1923, by Young.

Arctic Towhee. *Pipilo maculatus arcticus* (Swainson)

In the dry, dense, prickly shrubbery that formed a narrow band of cover along Milk River, the Arctic Towhee was a very common species, July 19-24, 1945. None was seen elsewhere in 1945, being conspicuously absent from the shrubbery of the Cypress Hills where we expected to find it.

Specimens, National Museum of Canada:

Medicine Hat: 4 ♂; May 11-26, 1894; Spreadborough.
Milk River: 1 ♂, 1 ♀; July 19, 1945; Rand and Clemens.
Deer Creek, Milk River: 1 ♂; July 17, 1927; Soper.
Sweet Grass Hills: 1 ♂; July 9, 1927; Soper.

Lark Bunting. *Calamospiza melanocorys* Stejneger

A common and conspicuous bird of the open prairie, but rather local in occurrence, apparently favouring areas where grass is longer and denser, or where there is sage brush and grass giving a denser ground cover. Here the species seemed to live in loose colonies. On the short-grass, heavily grazed prairie these birds were absent.

Specific occurrences are as follows:

At Cassils only a single bird, a male, was seen, June 29, 1945; between Tilley and Medicine Hat the species was fairly common June 23 and June 29; a few were seen in the grass country surrounding the Cypress Hills, but it was not common there in early July. Between Manyberries and the Dominion Range Station, in areas where the grass was relatively long and dense, many of these birds were seen along the road, July 13. About the Range Station July 14-23, the species was found in only two places; in the sage-brush flats it was common in loose parties of up to ten males. Occasionally a female appeared, and was at once pursued by males. Every now and then a male would fly up 20 or 30 feet in the air and on widespread, fluttering wings give its loud rich song. These birds were apparently established in this area, and a male collected had greatly enlarged gonads. The other habitat in which the species was found here was in the wolf-willow and dense grass of Lost River Valley, where loose flocks of twelve to sixteen males were seen. When disturbed these flocks flew far over the valley, seemingly unattached to any one area.

In Waterton Lakes Park, Young collected a specimen on June 9, 1922, our only record for the park.

Specimens, National Museum of Canada:

Dominion Range Station: 1 ♂; July 15, 1945; Rand and Clemens.
 Pendant d'Orielle: 1 ♂ ad.; July 20, 1927; Soper.
 Waterton Lakes Park: 1 ♀; June 9, 1922; Young.

Nevada Savannah Sparrow. *Passerculus sandwichensis nevadensis* Grinnell

The Savannah sparrow is only a fairly common prairie bird, being largely absent from the short-grass, heavily grazed, arid country, and living wherever conditions are slightly damper, giving a better growth of grass, such as in the lower, better-grassed depressions and the edges of marshes and ponds where the grass attains a better growth. Such places occur often enough to enable this bird to exist as a fairly common breeding species.

It was recorded in pairs, presumably nesting, in such places about the Brooks area in late June; about the edges of the Cypress Hills, and in the shrubbery and grass of the bushes on top of the hills, July 6-13. In the more arid country about the Dominion Range Station, the species was naturally more local in occurrence.

Taverner, in his traverse of southern Alberta recorded up to fifteen birds in a day, between Elkwater and Many Island Lake.

In Waterton Lakes Park, Young, in 1922, recorded the species occasionally from May 16 to September 9. Twenty-five birds on August 5 was the most seen on any one day. In 1945, Rand and Clemens found the species common in the better grasslands on the edge of the plains in the eastern part of the park.

Specimens, National Museum of Canada:

Cassils: 3 ♂ ad.; June 25, 28, 1945; Rand and Clemens.

Many Island Lake: 1 ♀; August 8, 1920; Taverner.

Cypress Hills: 1 ♀; July 9, 1945; Rand and Clemens.

Pakowki Lake: 1; August 5, 1920; Taverner.

Milk River: 2; July 2, 14, 1927; Soper.

Waterton Lakes Park: 1 ♂; July 8, 1923; Young.

Undoubtedly in migration the more northern, browner race, *P. s. anthinus*, which breeds in Mackenzie, occurs.

Western Grasshopper Sparrow. *Ammodramus savannarum perpallidus* (Coues)

Scarce summer resident locally in extreme southeastern Alberta, where it probably breeds.

On the valley of Lost River, near the Dominion Range Station, Rand found two of these birds on July 17. Their habitat was the little clumps of dense grass and low wolf-willow shrubbery in the open, short-grass, arid valley bottom. One bird was collected as it sat, about 2 feet above the ground, on the top of the low shrubs. It was a male, with enlarged gonads, and had its bill filled with insects, apparently to carry to its mate or young.

The specimen is very worn and faded. It is somewhat paler than Ontario birds and compares well with Manitoba specimens. Its measurements are: wing, 64; tail, 47; exposed culmen, 12 mm. In wing length it is closer to the western race, but the bill is large.

Baird Sparrow. *Ammodramus bairdii* (Audubon)

Evidently of local occurrence.

Taverner, in 1920, recorded six seen on August 7, between Elkwater and Many Island Lake. He writes they were singing in the fox grass on the dry alkaline plain, but he was unable to secure specimens owing to their wildness, and to the numerous Savannah sparrows that occupied the same territory and attracted the attention.

Soper, in 1927, collected three specimens, two at Deer Creek, Milk River, on July 14, 1927, and one on Milk River, longitude 112° 25', June 30, 1927.

Western Vesper Sparrow. *Pooecetes gramineus confinis* Baird

This is one of the few common and widespread birds of the open prairie. Though more common and widespread than the Savannah sparrow, spreading out onto more arid, closely grazed, short-grass country, it still is more common where the grass is slightly better.

At Cassils it was only fairly common June 22-28, 1945; in the Cypress Hills area it was the common sparrow of the open shrubbery and grass benches of the top of the hills, as well as in the surrounding country, frequenting both the drier and the wetter places with denser grass, July 1-13. About the Range Station, with its more arid conditions, the species was common, more so in the areas with better grass, but also out onto edges of the arid plains, July 14-24. On July 16, a young bird barely able to fly was seen.

Taverner recorded the species almost daily in his traverse of the plains, in 1920, twelve being the most recorded in one day.

In Waterton Lakes Park the vesper sparrow was fairly common in the grass country at low altitudes on the edge of the plains, July 27 to August 11, 1945. Young, in 1922, recorded the species frequently from May 18 to September 8; ten birds were the most recorded on any one day.

Specimens, National Museum of Canada:

Medicine Hat: 7 ♂; April 30-May 8, 1894; Spreadborough.
 Cypress Hills: 1 ♂, 1 ♀; July 1-5, 1945; Rand and Clemens.
 Pakowki Lake: 1 ♂; August 5, 1920; Taverner.
 Dominion Range Station: 2 ♂, 1 ♀, 1 sex?; July 14-24, 1945; Rand and Clemens.
 Milk River: 2; June 27-July 17, 1927; Soper.
 Waterton Lakes Park: 3 ♂; May 18-June 15, 1922, 1923; Young.

Western Lark Sparrow. *Chondestes grammacus strigatus* Swainson

Common locally where natural, arid-type shrubbery exists in valleys, but absent from the plains themselves, in our experience.

In the valley of Milk River, July 19-24, 1945, the lark sparrow was in the shrubbery along the river, not only in the sage bush and the denser shrubbery, but also perching in the poplars in the groves. One nest was found on July 19. It was a cup of grass, set in the ground under a small sage bush in a stand of open sage. The nest contained three eggs. The adult was flushed from the nest.

Elsewhere the species was found only in the valley of Lost River, July 16-18, where occasional pairs of birds were found among rocks and shrubs, and where the species was fairly common in the areas of wolf-willow shrubbery. They evidently nested here also, as a short-tailed fledgling was taken on July 18.

Specimens, National Museum of Canada:

Medicine Hat: 7 ♂ ad.; May 10-28, 1894; Spreadborough.
 Milk River: 1 ♂ ad., 3 ♀ ad., 1 ♀ juv., 1 fledgling; July 18-24, 1945; Rand and Clemens.

Montana Junco. *Junco oreganus montanus* Ridgway

Common and widespread in Waterton Lakes Park, from low altitudes to timber-line, July 28 to August 9, 1945. Young, in 1922, recorded the species there from May 15 to September 20.

Specimens, National Museum of Canada:

Waterton Lakes Park: 6 ♂ ad., 1 ♀ ad.; May 9-16, 1922; Young.
 3 ♂ ad., 1 ♀ imm.; July 28-August 2, 1945; Rand and Clemens.
 Wing, ♂, 77, 79, 79, 80, 80 mm.

One adult male, taken May 9, approaches *hyemalis* in general colour; the others, though variable, have the back more or less brownish, and the flanks more or less pinkish. This is the subspecies that nests in the Rocky Mountains, north to Jasper area, but with a considerable mixture of *hyemalis* blood in the north at least.

Though I am following current usage and Miller's recent monograph (1941, Univ. Calif. Pub. Zool., 44, pp. 173-434) in considering *oreganus* a species distinct from *hyemalis*, I am of the opinion that they are conspecific. Miller recognizes *J. h. cismontanus*, a subspecies he considers

derived from the parent species *hyemalis* and *oreganus* and intermediate (except in size) and geographical range (in northern British Columbia and southern Yukon) between them.

Pink-sided Junco. *Junco oreganus mearnsi* Ridgway

Common and generally distributed throughout the Cypress Hills in clearings and forest edge of the pine and spruce forest at higher altitudes; but also found, though less commonly, on the lower edge of the Cypress Hills forests where aspen predominates. The junco was one of the few common, widespread birds there, June 29 to July 11, 1945. The young, with tails nearly full grown, were already out of the nest and strong awing by July 1. These birds were very similar in habits to the slate-coloured junco, and were quite tame, often coming about our camp to feed on crumbs, along with the chipping sparrow.

Specimens, National Museum of Canada:

Eagle Butte: 1 ♂ ad., 1 ♀ ad., 1 fledgling; July 22, 1927; Soper.
Cypress Hills: 3 ♂ ad., 2 ♂ imm., 2 ♀ ad.; June 30-July 9, 1945; Rand and Clemens.

There is only this single breeding population of this pale form, *mearnsi*, in Canada, that occupies the Canadian zone "island" of the Cypress Hills. The Cypress Hills are a single unit, lying partly in southeastern Alberta (Eagle Butte is a small outlier, just off the west end of the Cypress Hills) and partly in southwestern Saskatchewan.

Western Tree Sparrow. *Spizella arborea ochracea* Brewster

Spreadborough took two specimens, April 6 and 14, 1894, presumably on northward migration. They are in only slightly worn plumage, and are strikingly paler than birds in similar plumage from eastern Canada.

Western Chipping Sparrow. *Spizella passerina arizonae* Coues

Common about the edges of wooded areas, or in areas of open trees.

In the Cypress Hills the chipping sparrow was common on the edge of the forest, and in forest glades, of both the coniferous and the aspen stands, July 3-11, 1945. In the Dominion Range Station area the species was found in the areas of wolf-willow in Lost River Valley where a few were seen, and it was fairly common along the poplar groves and shrubbery of Milk River. Taverner, in 1920, August 5, saw two at Manyberries Creek, a water-course carrying much shrubbery and small trees.

In Waterton Lakes Park the species was common and flocking in the mixed shrubbery and grassland at low altitudes, July 28 to August 11, 1945, and it evidently is a common summer resident as Young recorded it almost daily from May 15 to September 8.

Specimens, National Museum of Canada:

Medicine Hat: 3 ♂ ad.; May 10-14, 1894: Spreadborough.
Eagle Butte: 1 ad.; July 28, 1927; Soper.
Cypress Hills: 3 ♀ ad.; July 1-9, 1945; Rand and Clemens.
Dominion Range Station: 1 ♂ imm.; July 23, 1945; Rand and Clemens.
Waterton Lakes Park: 2 ♂ ad., 3 ♀; May 25-July 15, 1922; Young.
1 ♀ ad., 2 ♀ imm.; July 30-August 6, 1945; Rand and Clemens.
Wing: ♂ ad., 69, 69, 70, 73, 73 mm.

Clay-coloured Sparrow. *Spizella pallida* (Swainson).

The clay-coloured sparrow was very common in the extensive areas of shrubbery, especially those composed of rose bushes, about the margins of the Cypress Hills, July 5-11, 1945; and wherever there was a patch of rose bushes and shrubbery in the Range Station area, July 14-20. At Waterton, August 6-10, sparrows in large flocks were common, and many of them were of this species.

Specimens, National Museum of Canada:

Medicine Hat: 1 ♂ ad., 1 ♀ ad., May 15, 22, 1894; Spreadborough.
Cypress Hills, 1 ♀ ad.; July 5, 1945; Rand and Clemens.
Deer Creek, Milk River: 1 imm.; July 13, 1927; Soper.
Waterton Lakes Park: 1 ♂ ad.; June 28, 1922; Young.
1 ♀ ad.; August 10, 1945; Rand and Clemens.

The Cypress Hills female was laying.

Brewer Sparrow. *Spizella breweri breweri* Cassin

A common but local summer resident.

In 1945, we found this species common in the wolf-willow and sagebrush country between the Dominion Range Station and Milk River, July 17-23. Twenty to thirty birds, including parties of fully fledged young, were seen in a few hours' walk in such habitat in a morning. The scattered nature of this habitat makes these birds local in distribution.

Specimens, National Museum of Canada:

Dominion Range Station: 3 ♂ ad., 3 imm.; July 17-23, 1945; Rand and Clemens.
Sweet Grass Hills: 1 ♂ ad.; July 10, 1927; Soper.
Deer Creek, Milk River: 1 ♂ ad.; July 13, 1927; Soper.

Cowan (1946, Condor, 48, pp. 93, 94) has given a sight record of this species at timber-line in Waterton Lakes Park, where the subspecies is probably *S. b. taverneri*. It is interesting that *S. b. breweri* should live only in the arid plains and be apparently completely separated from the alpine *S. b. taverneri* that lives under such different conditions. Cowan has suggested a difference in song between the two subspecies.

In the National Museum, besides the above specimens we have of this species: a series from southern Saskatchewan (*breweri*); a series from southern British Columbia (White Lake in Similkameen Valley, nearby Keremeos, and Midway) (*breweri*); and Banff, Jasper, and Atlin (*taverneri*). The specimens of *breweri* from the plains of Alberta and Saskatchewan are quite distinct from the *taverneri* from the alpine conditions of Banff, Jasper, and Atlin. But the specimens from southern British Columbia compared with southern Alberta and Saskatchewan *S. b. breweri* average slightly darker, with slightly wider shaft streaks. The darkest birds show a decided tendency toward *taverneri*, though still referable to *breweri*. Grinnell (1932, Condor, 34, pp. 231, 232) has pointed out that certain northern United States birds show appreciable tendencies toward *taverneri*, and it would appear that this is more marked in our Canadian material from southern British Columbia than elsewhere. In identifying birds taken in migration it should be kept in mind that there is this population that is somewhat intermediate between *breweri* and *taverneri*, though closer to the former.

Gambel White-crowned Sparrow. *Zonotrichia leucophrys gambelii* (Nuttall)¹

Evidently a migrant through southern Alberta, judging by the following specimens.

Specimens, National Museum of Canada:

Medicine Hat: 3 ♂ ad.; May 5-8, 1894; Spreadborough.

Waterton Lakes Park: 1 ♂ ad.; September 13, 1923; Young.

These specimens are darker generally than is *oreantha*, and three of them have the lores completely white, as is typical for *gambelii*. The fourth specimen resembles eastern *leucophrys* in general coloration, and in having the white superciliary line interrupted with the black line across the lores. It could be interpreted as a wandering example of *leucophrys*, but I prefer to consider it an aberrant specimen of *gambelii*, as is discussed below.

Oregon White-crowned Sparrow. *Zonotrichia leucophrys oriantha* Oberholser

A common bird of the Cypress Hills generally, and of Waterton Lakes Park.

In the Cypress Hills, June 30 to July 11, 1945, it was one of the commonest species, in the young pine plantations and the shrubbery and forest edge on top of the hills, and it ranged commonly somewhat beyond the lower edge of the forest, into the rose-bush thickets of the prairie edge where it consorted with Maryland yellow-throats, and clay-coloured sparrows. It sometimes fed along the lake shore with the red-winged and yellow-headed blackbirds. Males were singing regularly in this period, and two nests were found, one on July 4 containing two eggs, one on July 6 containing four eggs.

Taverner recorded this species also at Elkwater, on August 6, 1920, when he saw four.

In Waterton Lakes Park, Young recorded the species almost daily from May 16 to September 30, 1922, and Rand and Clemens found the species fairly common there July 28 to August 6, 1945.

We have specimens from Cypress Hills, July 3-7; Eagle Butte, July 23; Manyberries Creek and Waterton Lakes, May 21 to June 26. They compare much better with topotypical *oriantha*, kindly loaned by Dr. H. C. Oberholser, in their pale coloration than they do with the considerably darker eastern Canadian *leucophrys*. This is the first record of the subspecies for Canada.

This black-lored, pale race has been recognized only recently, but on our material it appears to be a fairly well-defined race. The Cypress Hills population, in Alberta and Saskatchewan, is a completely isolated breeding community. The range of the species is continuous in the Rocky Mountains, and intergradation with *gambelii* occurs in the Waterton Lakes-Jasper area.

The recently acquired material in the National Museum, and the topotypical material loaned by Dr. Oberholser, permit the elucidation of some interesting points about this species, and a brief survey is presented.

¹ Todd (1948; Proc. Biol. Soc., Wash., 61, pp. 19, 20) has shown we may have to use *Z. l. leucophrys* for the western birds now known as *gambelii*, and provides the new name *nigrilora* for the eastern bird.

The breeding range of *Zonotrichia leucophrys* is of a well-known pattern; across the northern part of the boreal forests of Canada, and in the west extending southward into the United States in the mountains and coastal area.

There are three main types of plumage variation as follows:

- (1) Lores white, back ruddy-brown and grey *Z. l. gambelii*
- (2) Lores white, back dull brown and olive *Z. l. nuttalli*
Z. l. pugetensis
- (3) Lores with black, back ruddy brown and grey . . *Z. l. leucophrys*
Z. l. oriantha

Though these three groups were considered by the 1931 A.O.U. Checklist as forming one species, protests against this treatment were voiced as late as 1926 by Swarth (Univ. of Calif. Pub. Zool., vol. 30, pp. 123, 124); 1930 by Swenk (1930, Wilson Bull., 42, pp. 81-93); 1932 by Oberholser (Sc. Pub. Cleveland Mus. Nat. Hist., 4, p. 12), and van Rossem (1945, Occ. Papers, Mus. Zool. Louisiana State Univ., No. 21, pp. 284, 285) who considered two or three species were represented. Their chief arguments were those of discontinuous variation, and lack of intergradation.

Grinnell (1928, Condor, 30, p. 188) points out that there is an approximate degree of uniformity of characters in the three major groups to make them excellent subspecies, rather than species, and that there are specimens that are intermediate between *nuttalli* and *gambelii*, or at least specimens whose identification was equivocal. This was apparently accepted by Swenk and Oberholser (l.c.), but they still held that the black- and white-colored birds should be kept as distinct species. In the following pages additional evidence as to their being conspecific is presented, and a suggestion as to the origin of the races.

Before going on to discuss the types and meaning of the several factors involved in subspeciation, it may be well to treat the forms in conventional taxonomic manner. The geographical variation that is discontinuous (as black vs. white lores; olive vs. red-brown and grey) will not be commented on here, but in the continuous variations of depth of colour of the upper parts in the red-brown and grey forms it is advisable to establish a scale indicating variation, by the numbers from 1 to 6, for intensity of general coloration: (1) being the palest (for Oregon birds) and (6) being the darkest general colour of the back, applicable to Yukon and Alaska birds, with the intervening numbers representing intermediate depths of colour.

Zonotrichia leucophrys leucophrys Forster

Diagnosis. Adult characterized by having the back feathers reddish brown edged with ashy grey; depth of colour of the back dark, varying from number 5 of our scale in the east to under 4 in the west (Manitoba); bend of wing, usually white, occasionally tinged yellowish; black bar from eye interrupting white superciliary stripe. Wing, male, adult, Quebec (5) 79-82 mm.; Ontario (migrants) (6) 77-82 mm.; north Manitoba (3) 78 mm.

Breeding Range. From southeast Quebec and Labrador to northern Quebec and northern Manitoba, where it meets and intergrades with the western form *gambelii*.

Remarks. The Ontario (migrant), Quebec (migrant and breeding), and New Brunswick (migrant) adults all have the black bar from the eye interrupting the white superciliary line, though its width, and the amount

of black in the lores vary. In migration, however, individuals with white lores have been taken as far east as eastern Ontario (Snyder, 1931, *Can. Field-Nat.*, 45, pp. 141, 142), and Massachusetts (Griscom, 1939, *New Eng. Nat.*, No. 3, p. 24) and have been referred to *gambelii*. The Manitoba specimens referred here all have a distinct black bar from the eye. In

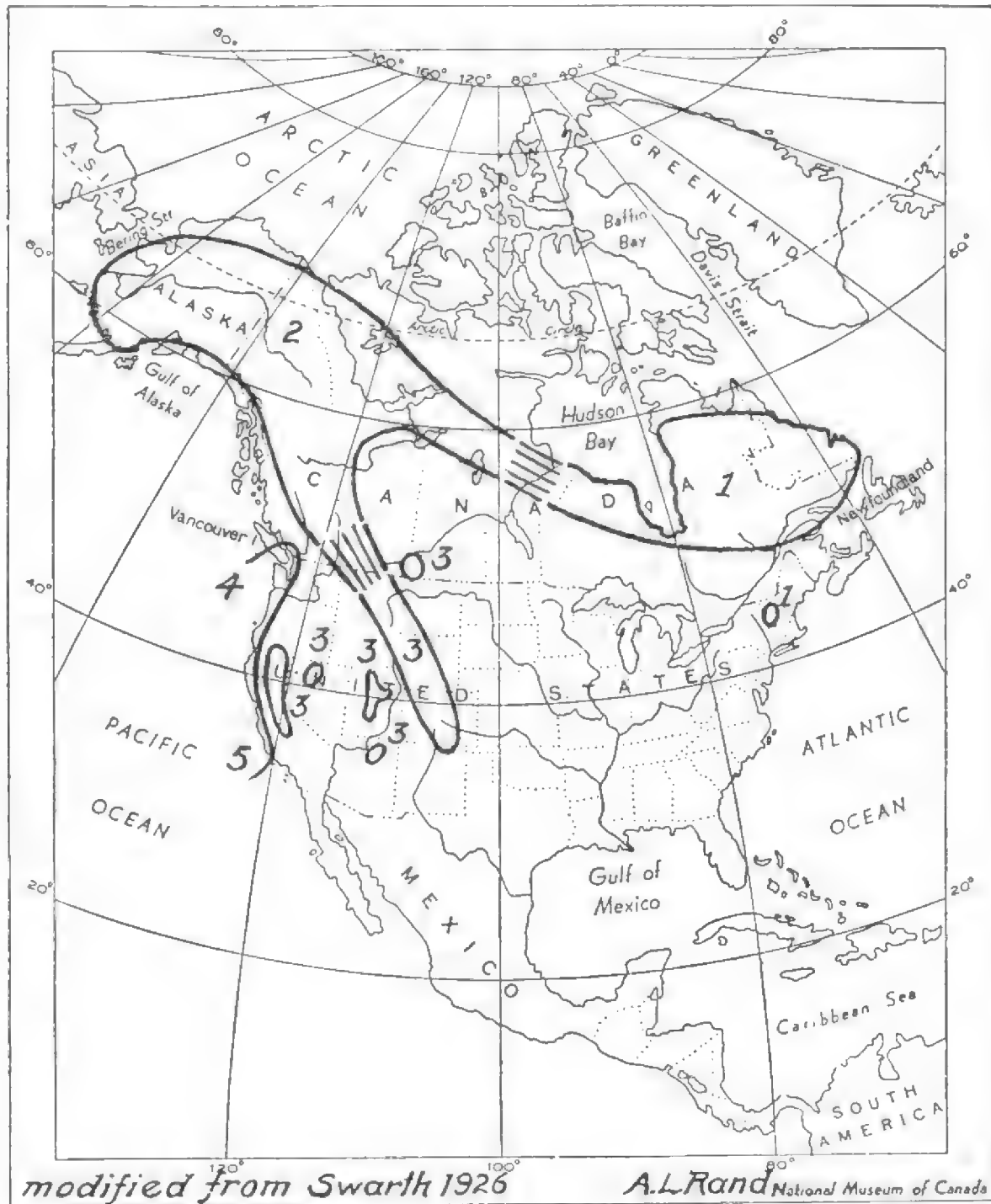


Figure 1. The ranges of the five races of *Zonotrichia leucophrys*: 1, *Z. l. leucophrys*; 2, *Z. l. gambelii*; 3, *Z. l. oriantha*; 4, *Z. l. pugetensis*; 5, *Z. l. nuttalli*.

some specimens it is as wide, and there is as much black in the lores as in Quebec birds; in others the black bar is much reduced and the black in the lores restricted; in other Manitoba specimens listed under *gambelii* complete intergradation with white-lored *gambelii* is shown. This area of intergradation is discussed in more detail under *gambelii*.

In general intensity of coloration of the upperparts there is some variation; the eastern birds, from Ontario and Quebec, are darker and may be represented by number 5 in our scale set forth above; whereas Manitoba specimens are slightly paler and may be represented by number 4.

A single adult female from Shoal Lake, southern Manitoba, September 22, 1917, taken in autumn migration, wing 76, is interesting in differing sharply from both *leucophrys* and *gambelii* in having the general colour of upperparts and flanks very similar to those of *pugetensis* from the British Columbia coast. This similarity includes the crown stripe being dull and greyish, nape dull, the edgings of the feathers of the upperparts being olive rather than grey, and the central stripes lacking a reddish tinge, the rump being olive-brown, and the flanks being heavily pigmented. On a casual inspection it would pass unnoticed in a tray of *pugetensis*. However, on closer inspection and comparison it is seen to differ from *pugetensis* in the bill being pink; the back stripes being more brown, less blackish; the paler grey breast and belly, the bend of the wing being white; and there is a narrow black bar from the eye interrupting the superciliary line. It is here included in *leucophrys* on the basis of one character, the black bar from the eye; in general colour it could be referred to *pugetensis*; on bill colour and bend of wing colour it could be referred to either *leucophrys* or *gambelii*.

It would seem this was a specimen from the mixed *leucophrys-gambelii* population, breeding in Manitoba, and the sporadic appearance of the *pugetensis* character here is an expression of latent *pugetensis* potentialities this far east. Other related cases of this kind are discussed under *gambelii*.

The young in their first autumn plumage, from Quebec and Ontario, are rather uniform, and dull and dark in general tone. Some of the Manitoba immatures are probably the offspring of *leucophrys*-like parents; but as they all differ in paler, brighter colour from eastern *leucophrys*, they are referred to under *gambelii*. Occasional specimens from Ontario, both adult and young, have a distinct tinge of yellow on the bend of the wing.

Specimens examined:

- New Brunswick: adult, 1 (Miscou Island, May 26).
 Quebec: adults, 6 (Trout River, 1, June 2; Wolf Bay, Saguenay co., 1, June 22; Great Marattina, 1, June 29; Hatley, 2, Sept. 28, Oct. 1; Aylmer, 1, Sept. 21).
 Immatures, 5 (Natashkwan, 1, Aug. 6; Hatley, 1, Sept. 30; Meach Lake, 1, Sept. 26; Aylmer, 2, Oct. 7).
 Ontario: adults, 11 (Ottawa and vicinity, 6, May 17, 21, and Sept. 21, 26; London, 1, May 11; Pt. Pelee, 4, May 8, 29, and Oct. 9).
 Immatures, 7 (Ottawa, 3, Sept. 29-Oct. 5; Amherstburg, 1, Oct. 10; Pt. Pelee, 2, Oct. 8, 14; Algonquin Park, 1, Oct. 22).
 Manitoba: adults, 10 (breeding: Bird, 1, July 6; Ilford, 2, July 20, 22; Herchmer, 5, June 22-July 22; migrants, Whitewater Lake, 1, May 5; Shoal Lake, 1, Sept. 22).

Zonotrichia leucophrys gambelii (Nuttall)

Adult. Differs from *Z. l. leucophrys* chiefly in having the eye-stripe, usually not interrupted by a black bar from the eye, and in averaging less black in the upperpart of the lores; the intensity of the colouring of the upperparts is dark but varies geographically, being darkest in Yukon and

Alaska and north British Columbia (6 on our scale), and palest in Manitoba and Jasper (4 on our scale). Immatures in their first autumn plumage follow adults in the intensity of dorsal coloration, but otherwise appear inseparable from *leucophrys*.

Wing, male, adult: north Manitoba (4) 78-82; north Alberta (migrants) (8) 78-80; Yukon (breeding) 78-79; Alaska, McCarthy, Chitina River, 76-81; Jasper (5) 76-81 (some worn); south British Columbia (migrants?) (5) 78-83.

Breeding Range. From northern Manitoba,¹ where it meets and intergrades with *leucophrys* to northern Mackenzie and Alaska, southward to southern Mackenzie, and the mountains east of the coast range south to southern British Columbia at least, and Alberta south to Banff, overlapping and intergrading with *oriantha* to the south.

Remarks. In the character of the colouring of the lores, birds from Manitoba (selected), Yukon, Alaska, Alberta (Jasper), and south British Columbia show only slight variation in the amount of white in the lores in most specimens. However, in breeding colonies from northern Manitoba complete intergradation with *leucophrys* occurs; in the north Alberta series one black-lored bird is represented; and in south British Columbia and southwest Alberta both types occur, apparently with few intergrades.

To discuss the Manitoba birds first: Taverner and Smith collected thirty-one adults on their breeding grounds, from Ilford (Hudson Bay Railway mile 286); Herchmer, Bird (Hudson Bay Railway mile 349), and Churchill. Of these, eight have a definite black line from the eye interrupting the white superciliary line; sixteen have no such line; and seven are definitely intermediate, with mixed black and white-tipped feathers, or feathers largely black with faint white tips. In the nature of the problem, with complete intergradation, the divisions are somewhat arbitrary and a re-examination might change the allocation of a few specimens.

In this series are seven mated pairs with the following arrangement of mates (B = black lores of *leucophrys* type; W = white lores of *gambelii* type; I = intermediate).

Type	No. of pairs
♂ B × ♀ B.....	0
♂ B × ♀ I.....	1
♂ B × ♀ W.....	0
♂ I × ♀ B.....	1
♂ I × ♀ I.....	0
♂ I × ♀ W.....	2
♂ W × ♀ B.....	1
♂ I × ♀ I.....	0
♂ W × ♀ W.....	2

¹ Todd, 1948, Proc. Biol. Soc. Wash., 61, pp. 19, 20, indicates this is the form building at the mouth of the Severn River, northwestern Ontario.

Though the sample is small, not one pair for each possible category, the distribution is wide and there appears to be little selective mating.

In the adult specimens (migrants and breeding) from Saskatchewan, northern Alberta, south to Edmonton, Mackenzie, Yukon, Alaska, and north British Columbia, south to Hazelton (in all, thirty-four specimens), there is one specimen with a black bar from the eye (a specimen from Lac la Nonne, September 27, 1926) that is inseparable from Quebec *leucophrys*. In considering its actual identity, whether it actually represents a stray specimen of *leucophrys* parentage or not, it must be kept in mind that it is characterized by only a single slight, even though rather trenchant character and that one of the rather "trenchant" characters of a race even more removed geographically and in appearance (*pugetensis*) has appeared in a bird otherwise *leucophrys* from Manitoba. It seems probable that this one character (black eye-bar) is a latent potentiality of the *leucophrys*-type of coloration in the *gambelii* population, and this becomes more evident in the following discussion of the birds from southwest Alberta and south British Columbia given below.

From the latitude of Jasper, south along the Rocky Mountains, where this species breeds, there is a gradual change in the frequency of occurrence of black-lored birds, as follows:

	Black lores	Intermediates	White lores
North of Jasper.....	0	0	All
Jasper.....	1	1	16
Banff vicinity.....	3	0	1
Waterton Lakes and vicinity.....	6	0	1

Southward into Montana both types breed in the north at least (Saunders, 1921, Pacific Coast Avifauna, No. 14, p. 120, who says both types are equally common in Glacier National Park; but Mrs. Bailey gives *leucophrys* as the common species, and *gambelii* as recorded only once in Glacier Park (Wild Animals of Glacier National Park, 1918, pp. 176, 177)).

We have definite breeding records of the *leucophrys* type in Crowsnest Pass, in British Columbia (Brooks and Swarth, 1925, Pacific Coast Avifauna No. 17, p. 92) and of both types breeding in the Yellowhead Pass area, British Columbia (Riley, 1912, Can. Alpine Jour., p. 66).

Migrant specimens from other Alberta localities on the plains are: white-lored, Red Deer, 1; Medicine Hat, 2; black-lored, Medicine Hat, 1.

In southern British Columbia, the specimens, mostly migrants are largely white-lored, as follows: white-lored, twenty-one (Elko, 2; Midway, 2; Osoyoos Lake, 2; Penticton, 7; Rainbow Mountain, 2; Revelstoke, 6); only two are black-lored (Elko, 1, May 10; Newgate, 1, May 14); and one is intermediate (Osoyoos, 1, May 10). Some undoubtedly would have bred farther north, but the absence of black-lored individuals from northern collections suggests some would not. Of the black-lored examples, the Elko one has restricted black in the lores, and narrow black bar, the other has much black, and a wide black bar, but both can be matched by Quebec examples.

Apparently in this area there is a gradual change in the percentage of white lores from 100 per cent north of Jasper (*gambelii*) to 0 per cent in south Montana (the next form *oriantha*, that also differs in another character, depth of colour of upperparts).

In general intensity of colour of upperparts there is considerable variation in the populations here referred to *gambelii*. Using the scale from 1 (pale) to 6 (dark) fixed on above for the species, depth of colour varies geographically in this subspecies as follows:

- 6-5, Alaska, Yukon, and north British Columbia (south to Hazelton).
- 5, North Alberta (migrants) and Mackenzie.
- 5-4, Jasper, and south British Columbia.
- 4, Banff, and Manitoba.

This shows a gradual change in intensity of general coloration from Alaska, darkest, to paler in Manitoba, and paler southward. Going eastward beyond the limits set for this subspecies, the species (form *leucophrys*) becomes darker again; going southward, the species becomes still paler (*oriantha*).

In the dry skins the adult bill is pinkish, with a blackish tip. There is some variation, with a slight tendency for Yukon specimens (breeding) to have paler, more yellowish bills.

Under *leucophrys* I have already called attention to one specimen that had the colour of the upperparts approaching the distant, isolated *pugetensis*. In the large series here referred to *gambelii*, there are two examples that in having the general colour of the upperparts dull brown and olive, instead of reddish brown and grey, recall *pugetensis*. One comes from Osoyoos Lake, B.C. It is a female adult, wing 72 mm., taken May 26, 1922. In deep pink bill colour, it is like *gambelii*; but in general colour, both above and below, it is intermediate between *gambelii* and *pugetensis*, and closer to the latter. Allocation is uncertain, but probably it belongs here. Another specimen taken, September 28, 1901, at Huntingdon, is a male adult, wing 76, and has been identified as *gambelii* by Oberholser, as *pugetensis* by Taverner. Again, it is intermediate in general colour, but perhaps slightly closer to *pugetensis*, though it has a deep pink bill like most *gambelii*. This is a doubtful specimen and is tentatively referred here. Some adults as far east as Manitoba show a slight yellowish tinge on the bend of the wing. This character is slightly more pronounced in north Alberta (migrant) specimens.

The immatures in first winter plumage seem to follow, in their intensity of coloration, the same pattern as that of the adult: Yukon immatures are dark; those from north Alberta and Manitoba are slightly paler and brighter brownish. In immatures, as compared with adults, the yellowish tinge on the bend of the wing seems to occur more frequently and to be more pronounced.

Some autumn immatures taken in migration on the British Columbia coast (Huntingdon, 4, September 23 to October 4; Brackendale, 2, September 1, 6; Cape Scott, 1, September 18; and Hope-Princeton Summit, 1, September 8) one might expect to be referable to *pugetensis*, but they compare well with Alaska Highway, British Columbia, autumn immatures in general coloration, faint or no wash of yellow on bend of

wing, and deep pink bills. They measure, wing ♂ (4) 78-80 mm.; and must be referred to *gambelii*, contrasting rather clearly with the four immatures of *pugetensis* from the same area that are discussed under the next form.

Specimens examined:

Manitoba: adults,	21 + 7 intermediates and 10 <i>leucophrys</i> (Churchill, 4 (breeding); Herchmer, 7 (+ 3 intermediates) and 5 <i>leucophrys</i> (breeding); Bird, 2, + 3 intermediates and 1 <i>leucophrys</i> (breeding); Ilford, 3, + 1 intermediate and 2 <i>leucophrys</i> (breeding); Whitewater Lake, 2, + 1 <i>leucophrys</i> (migrants); Shoal Lake, 3, + 1 <i>leucophrys</i> (migrants)).
Immatures,	11 (Churchill, 4 nestlings; Ilford, 2 nestlings; Cormorant Lake, 1, Sept. 5; Oak Lake, 3, Sept. 12, 14; Shoal Lake, 1, Sept. 24).
Saskatchewan: adults,	2 (Cypress Lake, 2, May 21, 30 (migrants)).
Immatures,	4 (Indian Head, Sept. 23).
Alberta: adults,	37 (Lac la Nonne, 9, Sept. 9-28; Edmonton, 1, May 7; Jasper, 18, June 19 to Sept. 10; Braggs Creek, 1, June 28; Banff, 3, May 16, 21; Red Deer River, 1, Sept. 7; Medicine Hat, 3, May 8 (migrants); Waterton Lakes Park, 1, Sept. 13 (migrant)).
Immatures,	14 (Wood Buffalo Park, 1, Sept. 19; Lac la Nonne, 5, Sept. 4-18; Jasper, 5, July 17 to Sept. 8; Red Deer River, Sept. 3-12).
Northwest Territories: adults,	5 (Great Slave Lake, 3, June 9-Aug. 17; Hill Island Lake, south Mackenzie, 1, July 15; Mackenzie Delta, 1, July 13).
Immatures,	2 (Fort Norman, 1, Aug. 31; Hantzsch River, Baffin Island, 1, Sept. 17).
Yukon: adults,	7 (Canol Road, 7, June 19 to Aug. 17).
Alaska: adults,	7 (Chitina River, 5, May 21 to June 26; McCarthy, 2, May 11).
Immatures,	3 (Chitina River, 3, July 11-21).
British Columbia: adults,	34 (Alaska Highway, 7, Aug. 26-Sept. 7; Hazelton, 1, July 15; Penticton, 7, Apr. 27-May 1; Elko, 3, May 10; Osoyoos Lake, 4, May 10-26; Revelstoke, 6, Apr. 23-29; Midway, 2, May 5; Huntingdon, 1, Sept. 28; Newgate, 1, May 14; Rainbow Mountain, 2, Sept. 14, 15).
Immatures,	11 (Alaska Highway, 3, Aug. 25-Sept. 3; Huntingdon, 4, Sept. 23-Oct. 4; Hope-Princeton summit, 1, Sept. 8, Brackendale, 2, Sept. 1, 6; Cape Scott, 1, Sept. 18).

Zonotrichia leucophrys oriantha Oberholser

Adults differ from those of both *leucophrys* and *gambelii* in the paler upperparts and underparts; also differs from *gambelii* in having the superciliary line interrupted by a black bar, resembling *leucophrys* in this; immatures are paler above. Wing, males, Oregon (10) 77-82 (av. 79.2) Oberholser; Cypress Hills, Sask. (7) 78-80; Waterton Lakes, Alberta (5) 78-80.

Breeding Range. Much fragmented: in the Hudsonian and Canadian zone, in the Alberta Rockies (Waterton Lakes), and in the isolated Cypress Hills (Alberta and Saskatchewan) (and possibly in Wood Mountain in southern Saskatchewan from whence we have a single summer specimen)

southward in the mountains to New Mexico, and locally westward to southern Oregon and central California. Intergrades and overlaps with *gambelii* in southwest Alberta and north Montana.

Remarks. Miller (1941, Condor, 43, p. 262), extended the range of this form to Wyoming and Utah; the additional data presented here extends the range considerably farther north, and provides the first records for Canada.

The existence of these southwest populations of *leucophrys*-like birds has long been known, and until their distinctiveness was recognized it gave *leucophrys* an interrupted range. The overlap in the character of presence or absence of black eye-bar, both occurring in one population, was also one of the strong arguments used by those who wanted to keep *leucophrys* and *gambelii* as separate species. With the discovery of other variable factors, the problem, complicated in some ways, permits of a better generalized picture.

My western United States material is a series of Oregon birds loaned by Dr. H. C. Oberholser. Apparently the Oregon, California, and the more eastern populations north to Montana, have black lores without exception. In Montana both types occur, breeding in the same areas in the northern part of that state (Saunders, l.c.) as they do in southwest Alberta, and the black-lored type decreases in frequency of occurrence northward to Jasper; in the Cypress Hills the breeding population is all black-lored, though white-lored *gambelii*, also recognizable by its darker coloration, occurs in migration there.

In intensity of coloration, the palest birds before me are those from Oregon; Cypress Hills birds are slightly darker, and Waterton Lakes birds average slightly darker again. Using our arbitrary scale of numbers they would stand:

- (1) Oregon
- (2) Cypress Hills
- (3) Waterton Lakes

The immature specimens available allow little to be said, beyond that a single bird in its first autumn plumage, from Oregon (August 6), is considerably paler than our palest *gambelii*, as is one immature from Manyberries Creek, south Alberta (August 5), indicating that, as in other races, the young correspond with the adult in intensity of coloration.

A slight yellowish tinge on the bend of the wing also occurs fairly commonly in the adults of this series.

Specimens examined, 23.

Saskatchewan: adults, 11 (Cypress Lake, 7, May 30-June 10; Cypress Hills, 1, May 24; Eastend, 2, June 21, 22; Wood Mt., 1, June 11).

Alberta: adults, 11 (Cypress Hills, 4, July 3-7; Eagle Butte, 1, July 23; Waterton Lakes, 5, May 21-June 26; Coleman, 1, June 16).

Immatures, 1 (Manyberries Creek, 1, Aug. 5).

Zonotrichia leucophrys pugetensis Grinnell

Adults differ from all the above races in the duller, darker coloration of the upperparts, the dorsal streaking being dull dark brown, not reddish brown, and the edgings of the back feathers being olive, not grey; the

posterior part of the white head-stripe being duller and greyer, the nape duller, and underparts duller grey, with the flanks more heavily pigmented; bend of wing consistently yellow, much more so than in any of the other races; bill yellow rather than pink. This race has an uninterrupted eye-stripe, as in *gambelii*; size slightly smaller than in any of the preceding races. Wing, male adult, coastal British Columbia (10) 71-75.

Breeding Range. A narrow strip along the Pacific coast, from Vancouver and Comox on Vancouver Island, British Columbia, southward to northern California (Del Norte and Humboldt counties, Grinnell and Miller, Pacific Coast Avifauna, No. 27, p. 523).

Remarks. The breeding range of this subspecies apparently does not meet that of any of the preceding races, though it meets that of the following.

In the material in hand the uninterrupted white eye-stripe, without the black bar from the eye, is constant.

Individual variation is slight. No individuals approach the reddish brown and grey coloration characteristic of the preceding races. However, Grinnell (1928, Condor, 42, pp. 45-48) mentioned intermediate specimens, taken in winter, that might have come from either *pugetensis* or *gambelii* populations; and above are discussed examples of *leucophrys* and *gambelii* that resemble *pugetensis* in general dorsal coloration.

The isolated breeding range of the *pugetensis-nuttalli* population and their general distinctive appearance, plus the scarcity of intermediates, have been used as reasons for keeping it as a separate species.

The isolated range is, of course, a poor argument, otherwise all island or islanded populations would be so considered; differences in appearance is little better. Grinnell has pointed out that intermediate specimens (presumably due to individual variation) exist and that the difference between *gambelii* and *pugetensis-nuttalli* is about what we expect between two good subspecies. Examining the differences in adults further, we find that they consist of, chiefly, general colour, size, bill colour, and colour of bend of wing. The yellow bend of the wing is also present in other races, but is more constant, and pigment intensified in *pugetensis-nuttalli*; in general colour, occasional specimens of both *gambelii* and *leucophrys* may closely approach the *pugetensis-nuttalli* type (See above). Comparing the adults of *pugetensis* with the first winter plumage of the preceding races, we find that there is a much closer agreement in general colour, and in the yellow of the bend of wing. In part *pugetensis-nuttalli* can be considered to have retained and modified certain characters that in the preceding races are now more evident in the immature plumage. In small size the present series shows no overlap, but the gap is small. The bill colour appears to be almost constantly different, yellow instead of pink, but there is some variation in the series of *pugetensis*, and although almost all specimens of the preceding races are easily separated from *pugetensis* on this character alone, a few specimens of *gambelii* from Yukon and Alaska are almost indistinguishable from certain examples of *pugetensis* on this character, though quite distinct otherwise.

Immature, first winter *pugetensis* is more similar to immatures of the preceding races than is the adult of *pugetensis* to the adults of the preceding races. They seem distinguishable chiefly by the average more olive, less

brownish upperparts; underparts washed with yellowish, yellower bend of wing, yellower bill, and smaller size. The well-marked Cape Scott specimen seems to be the most northern taken example of this form; probably a young bird that had wandered north. In the nestling plumage, five well-grown young largely in nestling plumage from Vancouver and Comox, compared with five from northern Manitoba (*gambelii-leucophrys*), are rather different in the much more yellowish, less greyish, white underparts; in the great reduction of the streaking of the breast, and in the somewhat more olive edgings of the feathers of the upperparts. Difference in bill colour is not apparent at this stage.

Specimens:

Adults, 15 (Comox, 3, July 11, Sept. 6; Victoria, 5, April 15, May 9; Departure Bay, 4, April 15, May 1; Douglas, 3, May 1, 10).
 Immatures, 7 (Cape Scott, 1, Sept. 26; Comox, 3, July 11-Sept. 6; Vancouver, 3, July 20, 24).

Nuttall White-crowned Sparrow. *Zonotrichia leucophrys nuttalli* Ridgway

Adults differ from *pugetensis* in the general, darker coloration, most evident on the rump; and narrower white crown stripe; a faintly distinguishable race, wing, ♂ 68.4-76.4 (specimens not seen, from Blanchard, 1941, Univ. Calif. Pub. Zool., 46, pp. 1, 10, 117).

Remarks. Grinnell points out (1928, Condor, 30, p. 189) that *nuttalli* seems to be farther removed from *gambelii* than is *pugetensis*.

Breeding Range. A narrow coastal strip from Mendocino county south to Santa Barbara county, California (Grinnell and Miller, 1944, Pacific Coast Avifauna, No. 27, pp. 523, 524).

Remarks. Blanchard (op. cit., p. 4) points out that the external morphological characters separating this race and the preceding are so slight and vary so within a single local population, as well as show intergradation between different populations, that individuals can be identified only in extreme groups of the range of variation.

Discussion

In the days when three species were recognized in this group, each based on a combination of trenchant characters, the situation appeared simple. But with the realization that many more variable factors are involved, that populations differ not only in external appearance but also in migratory instinct, times of migration, times of recrudescence of the gonads, moult programs, assumption of fat, and song pattern (Blanchard, 1941, and Swenk, 1930), the problem becomes involved.

However, though it is recognized that populations externally alike may differ genetically, in taxonomy subspecies must consist of populations that are recognizable by the morphological characters of a large percentage of their individuals (current convention is 75 per cent) and these populations must have a recognized range of some extent.

The morphological characters in the white-crowned sparrows show both continuous and discontinuous variation, probably acquired at different times.

Continuous variation is the more usual type in a continental area, with a character changing slowly over a larger or smaller area. In this species it is well illustrated by the general intensity of the coloration in the

three forms, *Z. l. leucophrys*, *Z. l. gambelii*, and *Z. l. oriantha*. The coastal races *pugetensis* and *nuttalli* are still darker. Though it cannot be plotted on a straight line, the distribution pattern of this cline with pale birds in the centre, and birds darkening to the west and to the east, is a fairly common one, seen also in the great-horned owl, purple finch, and Canada jay. In a case of this kind, with extremes rather different, there is a tendency toward recognizing a series of subspecies along the course of the cline. But unless the cline is interrupted by sudden changes or breaks, that is, unless it is a stepped cline, this seems unjustified, and further splitting seems undesirable.

The discontinuous variation found in this species is shown most clearly in the following characters:

Black lores vs. white lores.

Red-brown and ashy grey back vs. dull brown and olive back.

On these characters alone *leucophrys* and *oriantha* have black lores and red-brown and grey backs; *nuttalli* and *pugetensis* have white lores and dull brown and olive backs; and *gambelii* is an intermediate form, having one of the alternative characters of each group. I have shown above, also, that occasionally one of these characters may appear in the range of a population where it ordinarily does not occur, indicating a latent potentiality of one type within a population of the other type.

Discontinuous variation is uncommon in continental areas, and is usually restricted to species with well-isolated subspecies such as those with island distribution (Mayr, 1942, Systematics and the Origin of Species, p. 83). At the present time the *nuttalli-pugetensis* populations have an isolated breeding range, but those of *oriantha*, *gambelii*, and *leucophrys* are continuous.

It seems probable that these discontinuous variants may have represented at one time colour phases (polymorphism) within one continuous population. The segregation of these phases may have come about in glacial times with the population fragmented into four parts; one in the northwest, one in the east, one in the southwest, and one near the northwest.

For plants, in particular, this type of correlation has been worked out in more detail, and it is interesting to see the correlation between an example such as the white, Englemann, and Sitka spruces and the white-crowned sparrow. Halliday and Brown (1943, Ecology, vol. 24, pp. 353-373) show that white spruce (*Picea glauca*) survived glaciation in many refugia south of the ice, as well as in the unglaciated Yukon Valley; a northwestern form (*P. g. albertina*), probably related to the Yukon refugium, has spread eastward to meet the eastern form in Manitoba (paralleling *Zonotrichia l. gambelii* and *Z. l. leucophrys*); and down the Rocky Mountains, southward, to hybridize with Englemann spruce that probably moved in from a southern centre in post-glacial times (the parallel with *Z. l. gambelii* and *Z. l. oriantha* is striking, though Englemann spruce goes somewhat farther north than does *Z. l. oriantha*). Sitka spruce that probably survived maximum glaciation south of the ice, and has since moved northward, is restricted to the Pacific coast, and parallels the case of *Z. l. pugetensis-nuttalli*.

It seems reasonable to suppose that it was during glacial times that the discontinuous characters were fixed in the then isolated populations,

as they are in island subspecies. As the glaciation lessened the forms spread to their present limits, some meeting, and breeding with their nearest relatives where they met. Probably it was during or after their spread to their present limits that the continuous variation, depth of colour, became apparent.

From this point of view, it appears that isolation was present at one time for speciation to proceed some ways toward the species stage. But presumably the time of isolation was not long enough for well-defined species to evolve. Now interbreeding occurs, or where it is not possible because of geographical isolation (*pugetensis-nuttalli*) individual variation bridges the gap, and sporadically the most trenchant characters of one group appear in a distant population of another type.

Slate-coloured Fox Sparrow. *Passerella iliaca schistacea* Baird

In Waterton Lakes Park, Young collected one bird on May 19, and another on July 5, 1923; and Rand and Clemens collected one (male, wing, 79; tail, 77 mm.) on August 3, 1945.

Compared with three Jasper birds (nearly topotypical *altivagans*) these specimens have the back less washed with brownish; the rump and uppertail coverts considerably duller and grey, and the tail feathers edged with very much duller reddish brown. In these characters they compare better with birds from southern interior British Columbia. Swarth (1920, Univ. Calif. Pub. Zool., 21, pp. 156-157) has drawn attention to the fact that Banff specimens of *schistacea* show an approach to *altivagans* in their heavier marking below, their browner upperparts, and their short tails.

Aldrich (1943, Proc. Biol. Soc. Wash., 56, p. 163) has described *P. i. olivacea* from Washington with the suggestion that most British Columbia specimens that have been identified in recent years as *schistacea* are referable to this new form. Insufficient material is available for going into this question.

Lincoln Sparrow. *Melospiza lincolni lincolni* (Audubon)

Our only record is of two birds seen on June 9, 1922, by Young. One of these was collected; it is an adult male in slightly worn plumage.

Dakota Song Sparrow. *Melospiza melodia juddi* Bishop

Evidently of very local occurrence, where shrubbery occurs.

In the Cypress Hills, July 9-11, 1945, Rand and Clemens occasionally saw what they took to be song sparrows in the shrubbery along small streams. Song sparrows occur in the Cypress Hills in adjacent Saskatchewan (June specimens, National Museum), but they are evidently scarce in the Cypress Hills in Alberta.

In the dense shrubbery fringing Milk River a song sparrow was squeaked up and collected on July 19, 1945.

Specimens, National Museum of Canada:

Medicine Hat: 3 ♂; April 30-May 10, 1894; Spreadborough.
Milk River: 1 ♂; July 19, 1945; Rand and Clemens.

These birds compare well with southern Saskatchewan and southern Manitoba specimens and differ from eastern *melodia* (Ottawa, Ontario, to Nova Scotia), in the greyer, less reddish brown upperparts. Taverner (1928, Nat. Mus. Canada, Bull 50, p. 99) has already identified Belvedere specimens as *juddi*, and examination of his specimens confirms his identification. Flemming and Snyder (1939, Occ. Papers Royal Ont. Mus. Zool., No. 5) found that *juddi* is the form of northern and western Ontario. The range of the subspecies in Canada is evidently from western Ontario to Alberta (except the mountains of the west) north to the limit of the range of the species, though no western specimens have been seen from north of central Alberta.

Rusty Song Sparrow. *Melospiza melodia morphna* Oberholser

This is the song sparrow of much of British Columbia, and the eastern side of the Rocky Mountains in Alberta. It is evidently scarce in its range in Alberta. In Waterton Lakes Park, Young recorded it only once, on May 18, 1922; and Rand and Clemens took one on August 10, 1945.

The specimen is in immature plumage and compares well with British Columbia and Jasper specimens in similar plumage, rather than the very different, lighter and more streaked *juddi* of most of Alberta.

McCown Longspur. *Rhynchophanes mccownii* (Lawrence)

Common on the open short-grass prairie, where it shares the distinction, with the chestnut-collared longspur and the horned lark, of being one of the few common, widespread birds of the open country. But even this species seems to be somewhat local in distribution.

It was recorded commonly in the Cassils area where it was particularly common on certain high sage ridges, June 25-26, 1945, when males were giving their flight song; recorded commonly from the Cypress Hills to Milk River, and in the area of the Dominion Range Station, July 13-23. At the last mentioned locality, many were coming commonly to drink at the irrigation reservoirs, along with the horned larks and the chestnut-collared longspurs.

Taverner evidently found the species only fairly common in his traverse of the province in early August, though he recorded almost twenty birds seen on August 4 near Lake Pakowki.

The species is well represented by a series from southern Alberta, collected at Medicine Hat, April 26 to May 24, 1894, by Spreadborough; on Milk River, June 23-27, by Soper; at Etzikom and Pakowki Lake, August 3, 4, and 5, 1920, by Taverner; and at Cassils and Dominion Range Station, June 25, July 14, 1945, by Rand and Clemens.

Chestnut-collared Longspur. *Calcarius ornatus* (Townsend)

A common, widespread species of the open plains, from Cassils to Milk River, June 25 to July 19, 1945.

At Cassils it was common in both the richer grass flats near the irrigation ditches, and out on the sage-brush flats. It sang all day long, in the heat of the sun, or on cloudy, rainy days. Ordinarily it flew up a few yards, then with wings held over its back it sailed down, singing its short,

musical song. But sometimes, instead of dropping back to the ground, the bird flew circling about, stopping to sail and sing periodically in its flight. Several nests with eggs, and one nest with five young, were found, June 25-28. At the Dominion Range Station the species came commonly to water to drink.

Taverner, in his traverse of the prairie evidently found this a very common species, recording on August 2 and again on August 4 about five hundred birds between Caruso and Medicine Hat. In Waterton Lakes Park, Young recorded two chestnut-collared longspurs on August 5, 1922.

Specimens, National Museum of Canada:

Strathmore: 1 ♂; July 31, 1920; Taverner.

Cassils: 3 ♂; June 24, 25, 1945; Rand and Clemens.

Pakowki: 1 ♂ fledgling; August 4, 1920; Taverner.

Milk River: 3 ♂; July 2, 1927; Soper.

Dominion Range Station: 1 ♂; July 18, 1945; Rand and Clemens.

